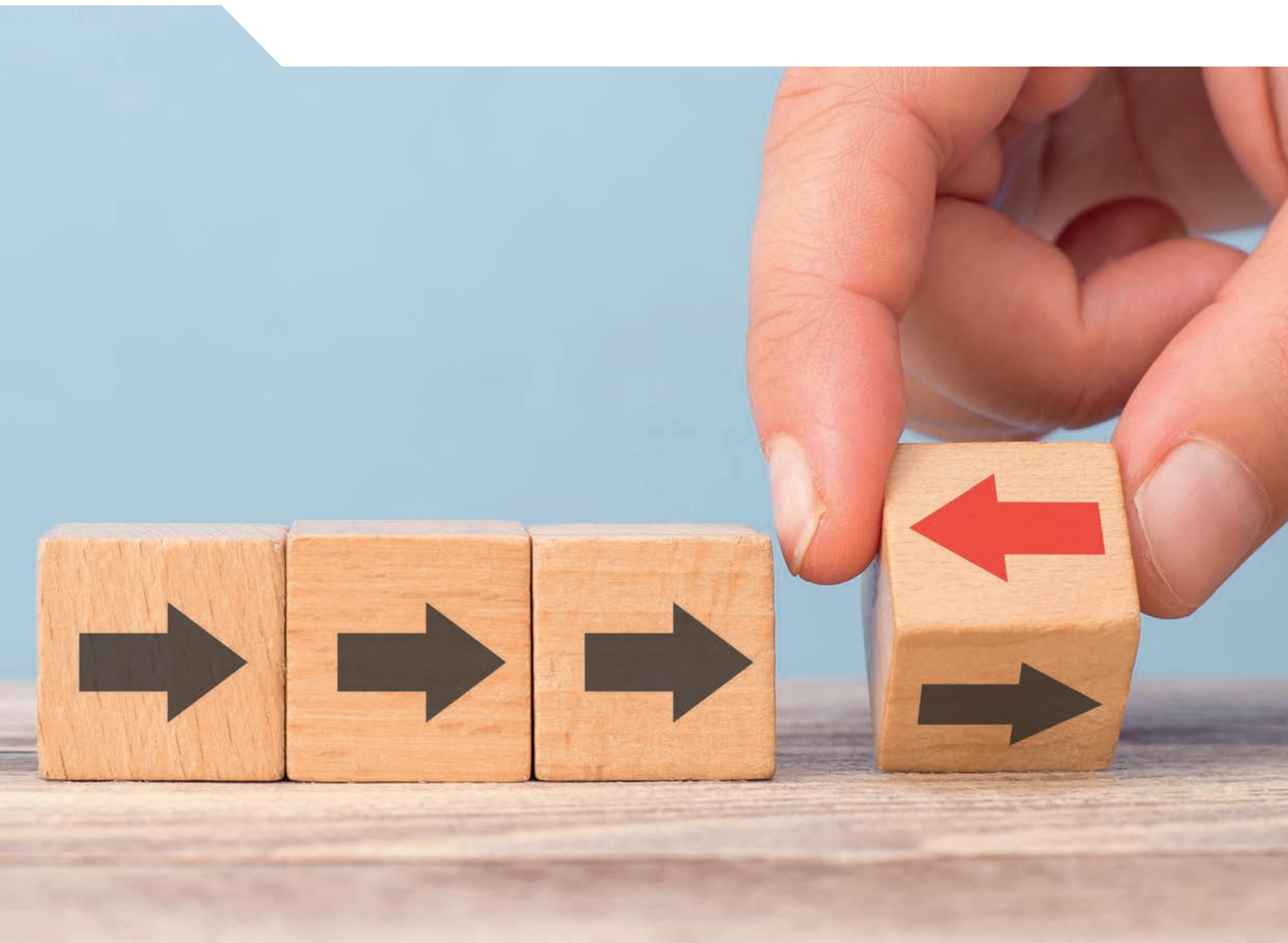
OECD Compendium of Productivity Indicators 2024



OECD Compendium of Productivity Indicators 2024

BETTER POLICIES FOR BETTER LIVES

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Reader's guide

> *"Productivity isn't everything, but in the long run it is almost everything" (Paul Krugman, 1994).*

Productivity is commonly defined as a ratio between the volume of output and the volume of inputs. In other words, it measures how efficiently production inputs, such as labour and capital, are being used in an economy to produce a given level of output. Productivity is a key source of economic growth and competitiveness and, as such, internationally comparable indicators of productivity are central for assessing economic performance.

The *OECD Compendium of Productivity Indicators* examines recent and long-term trends in productivity, providing insights on:

- Insights on productivity developments in 2023 based on experimental estimates
- Cross-country comparisons of labour productivity levels
- Contributions of labour and capital inputs, and multifactor productivity, to economic growth
- Sectoral reallocations of hours worked
- Productivity in small and medium-sized enterprises (SMEs) and large firms
- Evolution and composition of investment
- Changes in labour income and productivity growth

The OECD Productivity Statistics Database

Most of the indicators presented in this publication are drawn from the OECD Productivity Statistics Database, which provides a consistent set of annual estimates of labour, capital and multifactor productivity growth and other related indicators to analyse the drivers of economic growth in OECD member countries and G20 economies. The database includes the following indicators:

- GDP per capita and labour productivity levels
- Labour productivity growth
- Measures of labour input, such as total hours worked and total employment
- Measures of capital input, as an aggregate and by type of asset
- Multifactor productivity growth

Country, time, and industry coverage of the *Compendium*

The *OECD Compendium of Productivity Indicators* includes data for OECD countries, and, whenever possible, for non-OECD G20 economies.

It covers the period 1995-2022 in most chapters, with breakdowns between 2000-2007 and 2010-2019 to visualise the slowdown in GDP and productivity growth. Chapter 6 on Productivity in SMEs and large firms includes data since 1990 whenever possible. The findings in this publication are based on data as of 8 February 2024.

Throughout this publication, all breakdowns by industry follow the International Standard Industry Classification of all Economic Activities (ISIC). Indicators by industry are presented according to its latest version, ISIC Rev.4, or the European equivalent, NACE Rev.2 (Nomenclature statistique des Activités Économiques dans la Communauté Européenne).

References and further reading

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1 Overview

The OECD Compendium of Productivity Indicators 2024 sheds light on recent developments in labour and multifactor productivity across OECD countries, looking at their key components and putting those developments into a historical perspective. It also offers granular productivity insights, based on industry composition and differences between SMEs and large firms.

The publication covers OECD countries and, where possible, G20 countries. In addition to the key findings on productivity measurement, this edition includes a chapter on experimental estimates of labour productivity growth in 2023 for OECD countries.

The economic environment in 2022

The economic environment deteriorated and global uncertainties increased in 2022, reflecting the start of war in Ukraine and the ensuing energy crisis.

While international trade contributed to higher productivity growth in the past, lately there have been signs of stalling globalisation (Jaax, Miroudot and van Lieshout, 2023[1]) and slowing engagement in global value chains. Experimental estimates of trade in value added (TiVA) indicators in 2022 point to a decline in the share of domestic value added in exports both on average across OECD countries and in large emerging-market economies (Mourougane et al., 2023[2]).

A decline in global foreign direct investment (FDI) can curtail the dissemination of technological know-how and hamper productivity growth by limiting the diffusion of innovation and best practices. Global FDI flows fell by 12% in 2022, reflecting deteriorating economic and business environment. International project finance and cross-border mergers and acquisitions (M&A) were particularly affected by tighter financing conditions, from rising interest rates and uncertainty in financial markets (UNCTAD, 2023[3]).

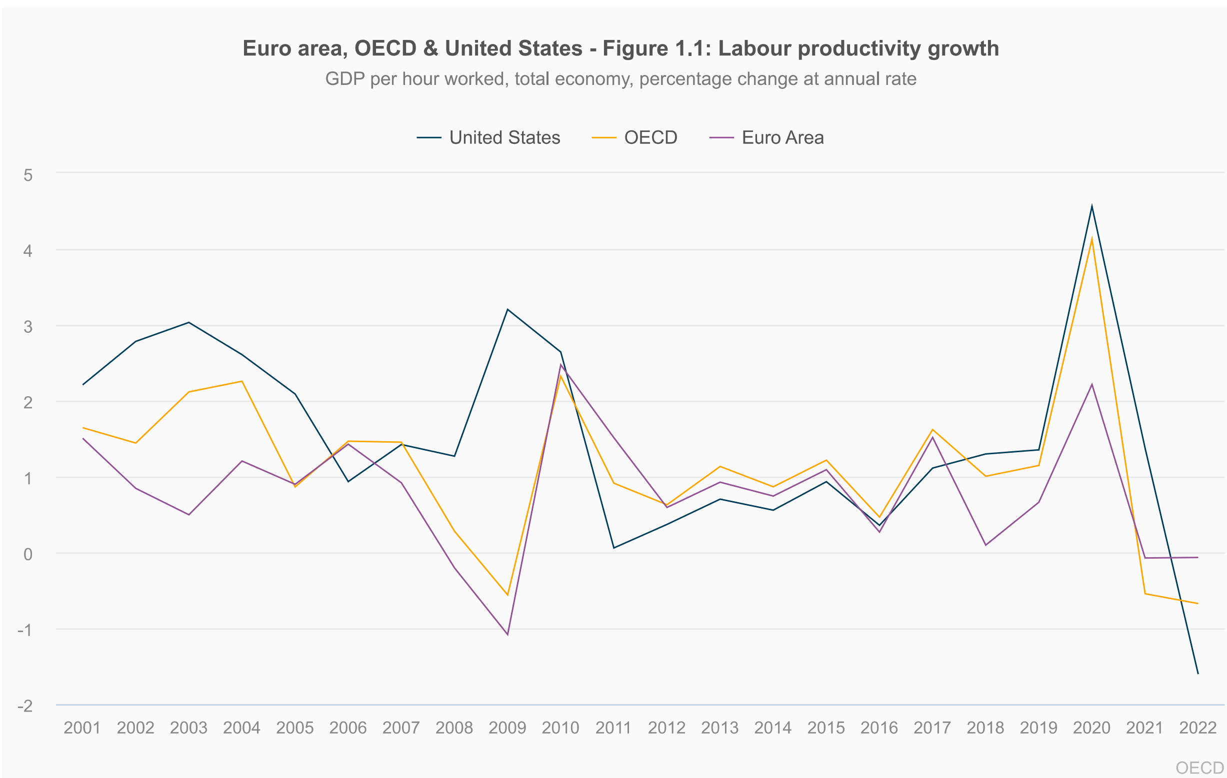
High inflation can deter investment and hamper productivity growth by increasing firms' operating costs and disrupting long-term planning. In 2022, inflation in the OECD, as measured by the consumer price index (CPI), reached levels not recorded since the 1980s. While prices started to pick up already towards the end of pandemic, fuelled by supply bottlenecks, as well as rising demand coupled with public stimulus measures, the war in Ukraine exacerbated inflationary pressures through surging commodity prices. Inflation has started to be on a downward trend since the end of 2022 as energy costs have dropped and tightened monetary policy has started to take effect (OECD, 2023[4]).

Labour market developments are closely linked to productivity developments. Labour shortages can lead to increased workloads and stress for workers, and firms may face operational constraints, delayed projects and increased labour costs. All those factors can affect productivity. Labour markets were tight in 2022. The number of firms reporting labour shortages increased significantly in the post-COVID period. Labour shortages were broad-based, but particularly pronounced in manufacturing, accommodation and food services, and health and social work (Causa et al., 2022[5]). In Europe, labour shortages impacted both high-skilled and low-skilled occupations. (European Commission, 2023[6]).

Firm dynamism is a key driver of productivity. In 2022, firm entries were broadly flat in the OECD while the number of firm bankruptcies rose markedly in the course of the year according to the OECD Timely indicators of Entrepreneurship. Preliminary data for 2023 indicate a rebound in firm dynamism – both entries and exits - in the first half of 2023, while the number of bankruptcies has remained elevated.

Productivity developments in 2022

In 2022, labour productivity – measured as GDP per hour worked – recorded negative growth rates in the euro area, in the United States and the OECD (Figure 1.1). The OECD and the euro area already experienced negative productivity growth rates in 2021, of similar magnitude. The United States, by contrast recorded a large drop in labour productivity growth, from 1.4% in 2021 to -1.6% in 2022, reflecting partly the counter-cyclicality of labour productivity growth. In addition, the strong employment creation during the same period suggests that part of the new jobs was created in low-productivity sectors (Chapter 5).



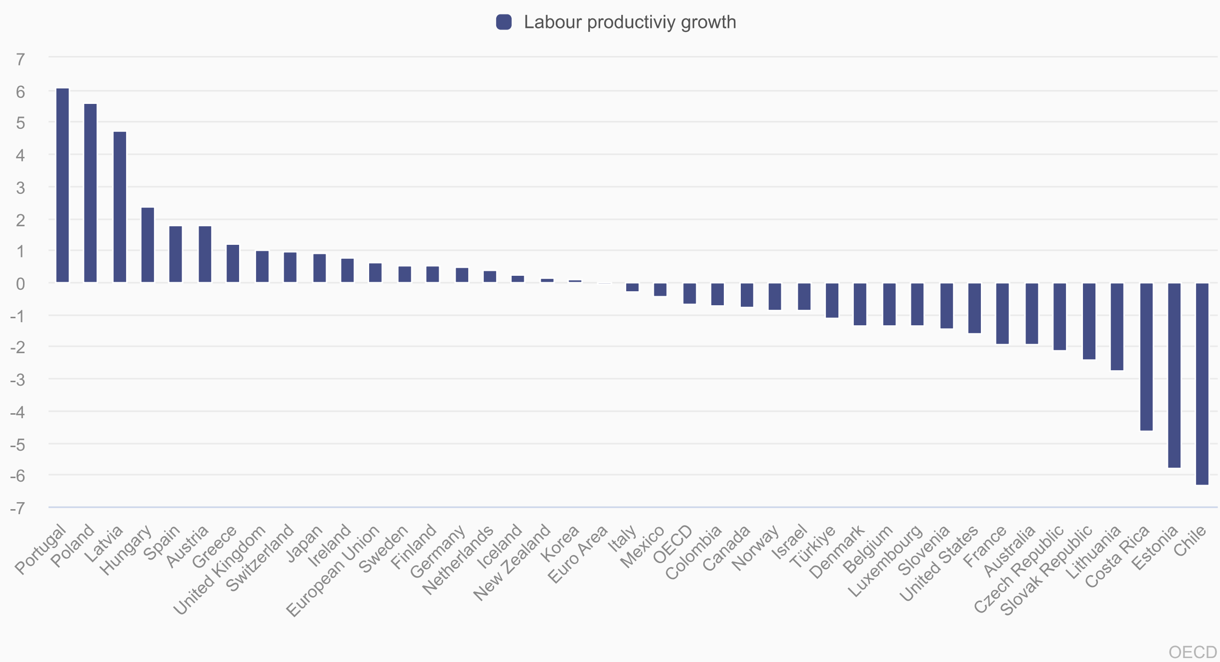
Compare: https://www1.compareyourcountry.org/compendium-productivity-indicators-2024/en/2/6338/default/all/FRA+DEU?embed=noHeaderNoNav.

There were large cross-country differences in labour productivity growth: it was positive in about half of OECD countries, and negative in the other half, with varying magnitudes. Chile, Estonia and Costa Rica experienced the lowest annual growth rates. Conversely, Portugal, Poland and Latvia were the top performers (Figure 1.2).

Differences in labour productivity levels across the OECD area were large in 2022. Measured as GDP per hour worked in PPP terms, average labour productivity in the OECD area was slightly above USD 67 per hour in 2022, with a standard deviation across countries of about USD 32. Over the longer period, labour productivity levels across OECD countries have converged since 2000, as most of the countries with labour productivity levels below the OECD average in 2000 have caught up considerably since then. However, the productivity gap with the OECD average deepened for Greece, Israel, Japan, Mexico and New Zealand (see Chapter 3).

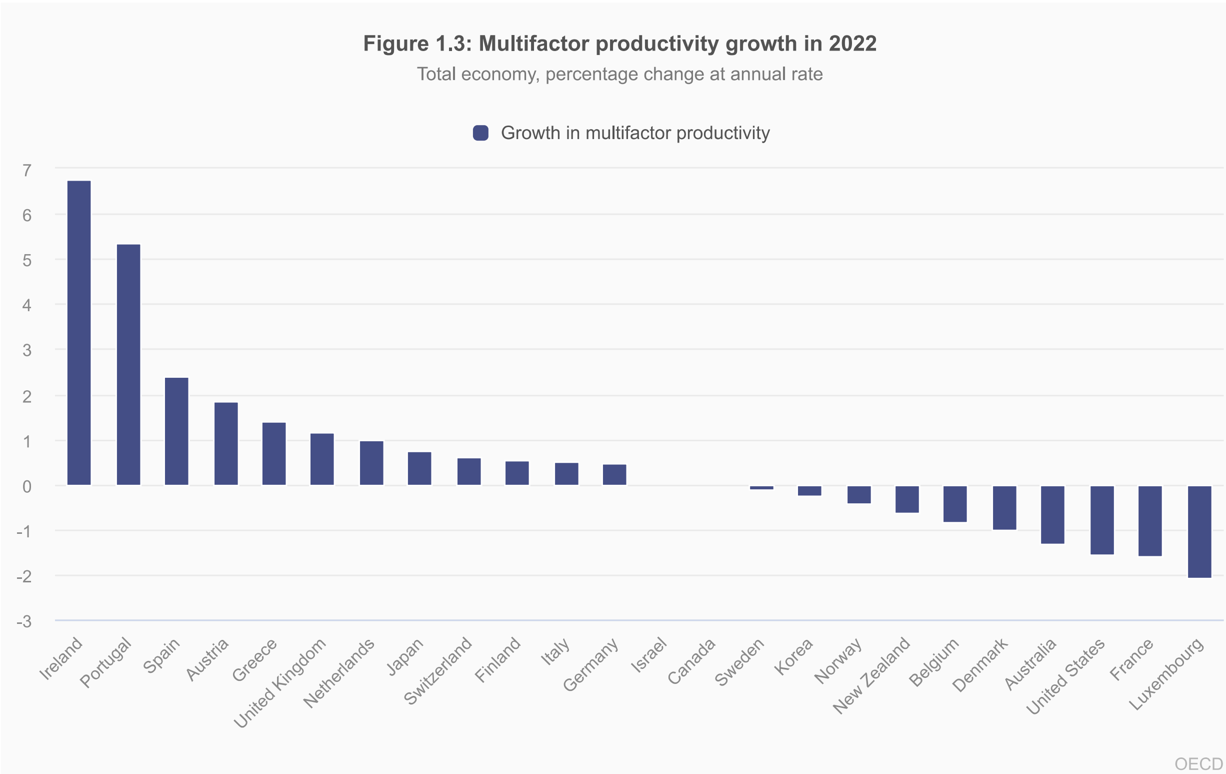
Figure 1.2. Country breakdown of labour productivity growth in 2022

GDP per hour worked, total economy, percentage change at annual rate



Multifactor productivity growth (MFP) slowed in 2022, and in some cases was even negative, in 10 of the 24 OECD countries for which data is available (Figure 1.3). The slowdown was particularly marked in the United States, where MFP growth fell from 1.7% in 2021 to -1.6% in 2022 (Figure 1.4), being the main driver of the negative labour productivity growth (see above and Chapter 4). Both labour and capital contributed to this slowdown. Sweden, Denmark, the Netherlands and Korea experienced a similar large decline in MFP growth as the United States. By contrast, MFP grew rapidly in Spain, Ireland and Portugal.

In line with MFP growth developments, the contributions of MFP to labour productivity growth in many countries was small or even negative in 2022 (Figure 1.5). Higher real interest rates and energy prices, and declining confidence are reflected in a negative contribution of capital stock to output ratio in OECD countries for the second consecutive year. On the other hand, capital quality, i.e. changing composition of capital stock, made a relatively small but positive contribution to labour productivity growth in most countries in 2022.



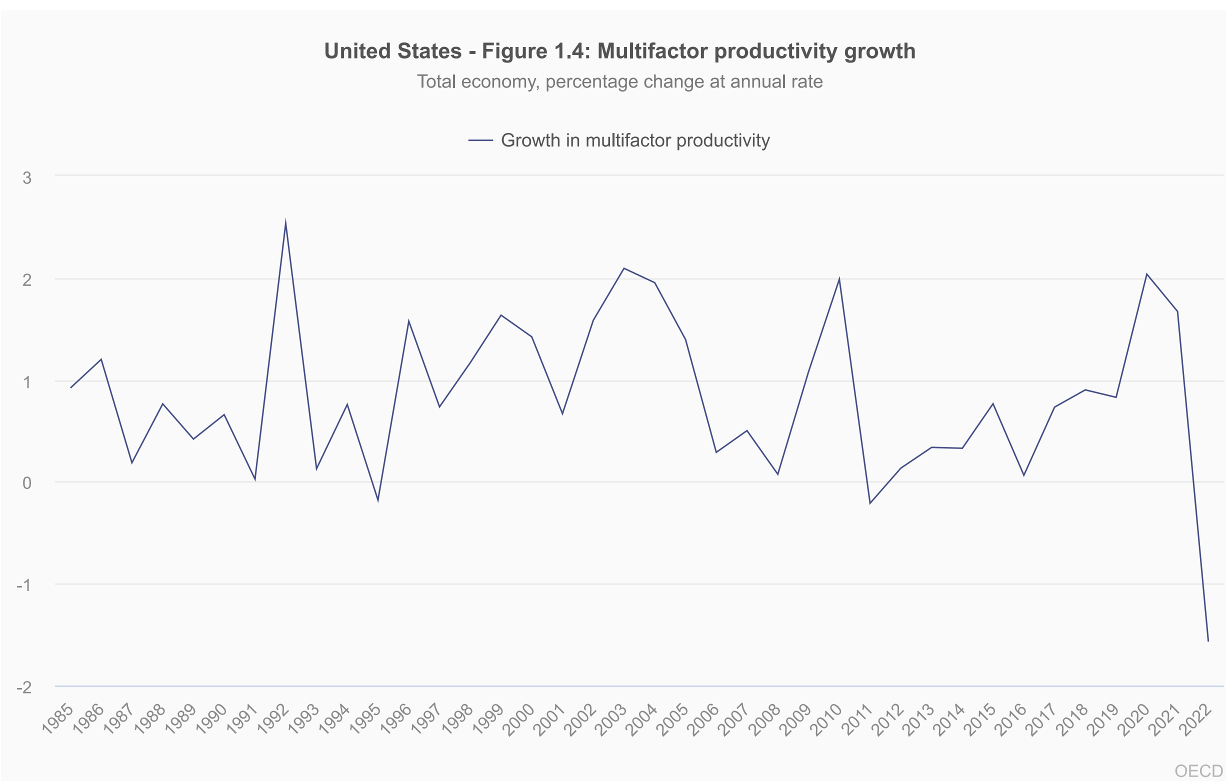


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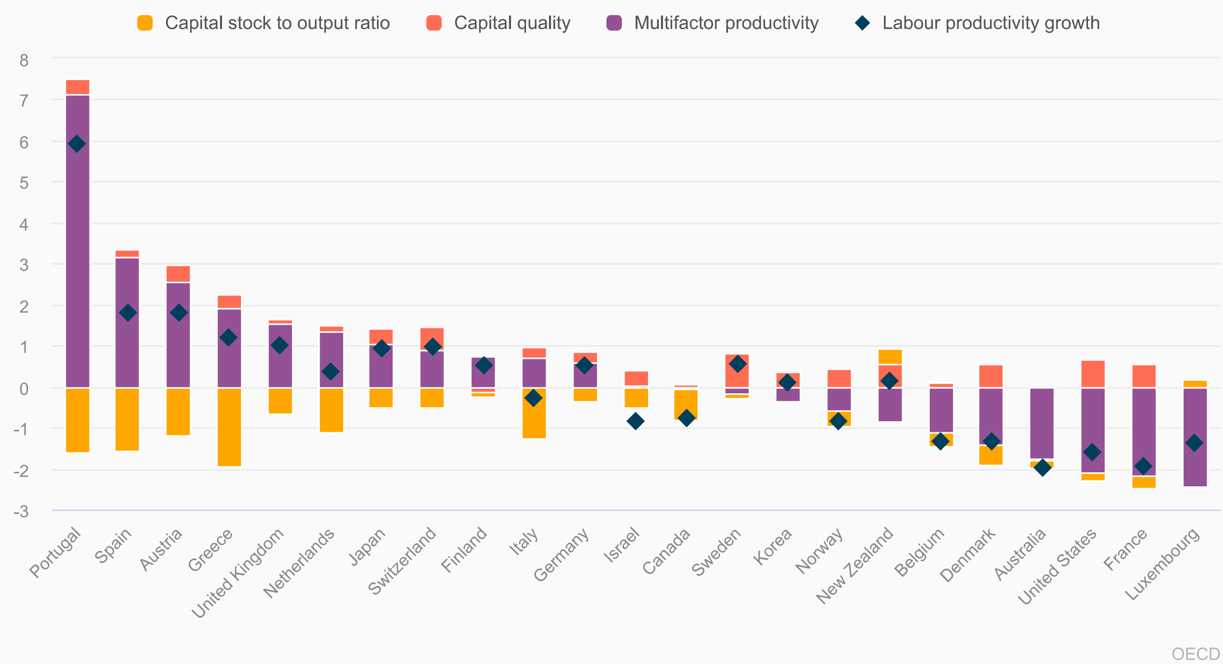
Figure 1.5: Contributions to labour productivity growth in OECD countries in 2022

Total economy, percentage change at annual rate



Labour productivity growth can be broken down into within-industry productivity developments and between-industry reallocation of hours worked between industries with different productivity levels or different productivity growth rates. In 2022, changes in within-industry productivity growth were the main contributor to the slowdown in productivity growth. They can stem from various factors and may themselves be a result of reallocation at a more disaggregate, i.e., firm level. The contribution of the reallocation of hours worked between industries decreased relative to the pandemic period and to the within-industry effect, and in many countries it even turned negative. Those developments confirm the temporary nature of the unprecedented between-industry reallocation effects during the COVID recession. They boosted productivity growth that year, as hours worked were reduced in contact-intensive and lower-productivity industries, like hospitality, personal services or transport. These developments have been gradually reversed post pandemic.

Investment is traditionally a key driver of productivity. In around half of OECD countries, investment grew faster than GDP in 2022, implying increasing investment rates (investment over GDP, in current prices) in these countries. Most of the OECD countries have already caught up with or even exceeded their pre-pandemic (2015-2019) investment rates, with the most notable exceptions being Ireland, Norway, Colombia and Poland. When looking at more disaggregated developments, Dwellings and Other buildings and structures were the most fast-growing asset category in many countries, while the investment rate of Intellectual property products (IPP) declined in most countries (see Chapter 7 on the evolution and composition of investment).

In most OECD countries labour productivity and (real average hourly) labour income in the business economy evolved in the same direction in 2022. However, due to different paces of these indicators, this still meant widening of the gap between them in some countries (e.g., Czechia, Hungary or the Netherlands), and narrowing in others (e.g., France Slovenia). By contrast, in Italy, Portugal and Spain labour productivity was stable or increased while real average labour income fell in 2022 (see Chapter 8 on changes in labour income and productivity growth for further insights).

Firm-level productivity depends on various factors, including the size of the enterprise and its sector of activity. Large firms had on average higher labour productivity as compared to smaller firms in OECD countries, but the picture is mixed when looking at specific industries. In manufacturing, the productivity gap between large and smaller firms was on average more pronounced than in the business economy as a whole, reflecting returns to scale from capital-intensive production (see Chapter 6 on productivity in SMEs and large firms).

Most recent productivity developments and risks to future productivity trends

Future developments in productivity have become increasingly uncertain, as several shocks, including the COVID shock and heightened geopolitical tensions, have hit economies, with potentially long-term scarring effects stemming from some of them (OECD/APO, 2022[7]). This has come on top of long-term trends such as ageing populations, declining competition and stalling globalisation, which can also hamper productivity developments. At the same time, digitalisation, Artificial Intelligence and the transition to a green economy offer opportunities to revive productivity growth (OECD, 2023[8]).

Overall, experimental estimates point to labour productivity growth of about 1.4% in 2023 on average across OECD countries (excluding Türkiye), close to the long-term average (over 2001-2019). These estimates are surrounded by large uncertainties. Labour productivity growth is estimated to have been modest in most OECD European and Asian countries in 2023 (1.5% in Europe and 1.8% in Asia on average across countries). A sizeable increase in productivity growth to 1.5% from -1.6% in 2022 is estimated in the United States. Volatility in labour productivity during the COVID period blurs signals in Canada (see Chapter 2 on Insights on Productivity Developments in 2023).

Looking forward, geo-political tensions in the Middle East, is a key near-term concern, particularly if these tensions were to spread. This could lead to significant disruptions in energy markets and key trade routes, as well as additional risk repricing in financial markets, which would slow growth and investment and in turn productivity. Headwinds from rising trade restrictions, inward-looking policies and the restructuring of global value chains also contribute to the uncertain outlook for global trade, which is a key concern given the importance of trade for productivity. (OECD, 2024[9])

Data sources

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2 Insights on productivity developments in 2023

Context and key findings

Developments in productivity have become more and more uncertain, as several shocks, including the COVID shock, the energy crisis, and more recently heightened geo-political tensions hit economies, with potential long-term scarring effects for some of them (OECD/APO, 2022[1]). This has added to long-term trends such as population ageing, declining competition and stalling globalisation, which can also hamper productivity developments. At the same time, digitalisation, Artificial Intelligence and the transition to a green economy offer opportunities to revive productivity growth (OECD, 2023[2]). Getting preliminary insights on most recent developments in productivity growth is thus useful to inform policymaking, identify policy needs or monitor the effects of policies.

Labour productivity statistics are usually released with a lag of one or two years, posing challenges for timely analysis and policy design. This chapter provides information on labour productivity (as measured by GDP per hours worked) developments in 2023 relying on experimental estimates for 38 OECD countries. Estimates are derived using a range of machine learning models, of varying accuracy across countries and should be interpreted with caution, especially for countries where confidence bands around estimates are large.

Key findings

- Overall, experimental estimates point to labour productivity growth of about 1.4% in 2023 on average across OECD countries (excluding Türkiye), close to the average over the long period (2001-2019). These estimates are surrounded by large uncertainties.
- Labour productivity growth is estimated to have been modest in most OECD European and Asian countries in 2023 (1.5% in Europe and 1.8% in Asia on average across countries).
- A sizeable increase in productivity growth from -1.6% in 2022 to 1.5% in 2023 is estimated in the United States. Volatility in labour productivity growth during the COVID period blurs signals in Canada.

What happened in 2023?

Average labour productivity growth, measured as GDP per hour worked, across OECD countries (excluding Türkiye) is estimated at 1.4% in 2023, close to pre-pandemic average of 2001-2019. The increase in labour productivity growth as compared with 2022 is estimated to be at best modest in all regions covered in the analysis, North America, Asia and Europe (Figure 2.1 and Figure 2.2). The absence of a significant improvement in productivity growth in 2023 is consistent with the expectation of a moderate real GDP growth for 2023, coupled with a decrease in hours worked relative to that of 2022 (OECD, 2023[3]).

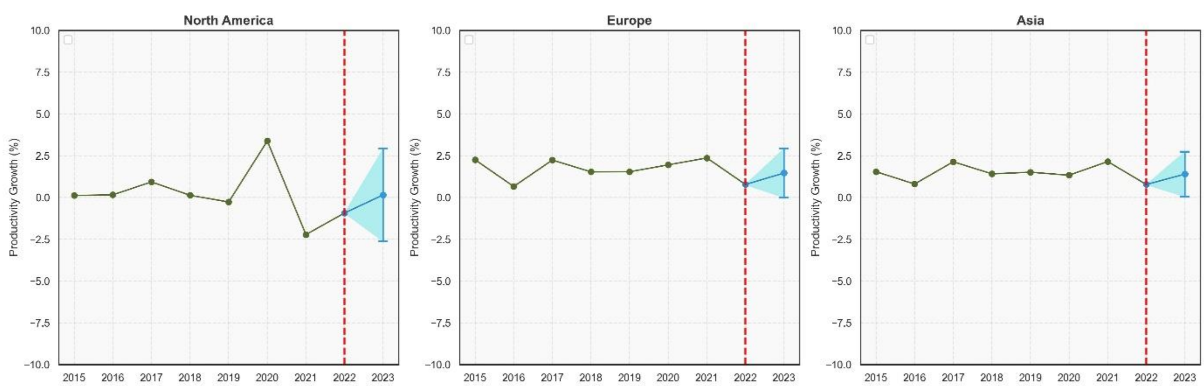
However, labour productivity growth is estimated to vary widely in 2023 across countries (Figure 2.3). Within North America, the United States and Mexico are expected to experience a significant rebound in productivity growth while productivity growth is estimated to be negative in Canada in 2023. Within Asia, a mild increase in productivity growth is estimated in both Japan and Korea. Within Europe, Ireland stands out as the best performer, although large volatility in the data lowers the accuracy of the nowcasts for this country. Labour productivity growth is estimated to be much more modest in the rest of European countries in 2023.

Experimental estimates derived from models estimated before the COVID crisis, would point to very similar outcomes in most countries. Labour productivity growth in the OECD is estimated to 1.7% using a model that does not include the information from during the COVID crisis as opposed to 1.4% when this information is included. There is no systematic under or over estimation across countries.

There are some notable differences, though. In Canada, where models fail to capture productivity developments during the COVID crisis, estimates range from -3.9% when the information from the COVID period is included to 1.3% when it is not. Other significant differences (above 2 percentage points) are visible for Greece and Slovak Republic.

Figure 2.1. Labour productivity growth by region

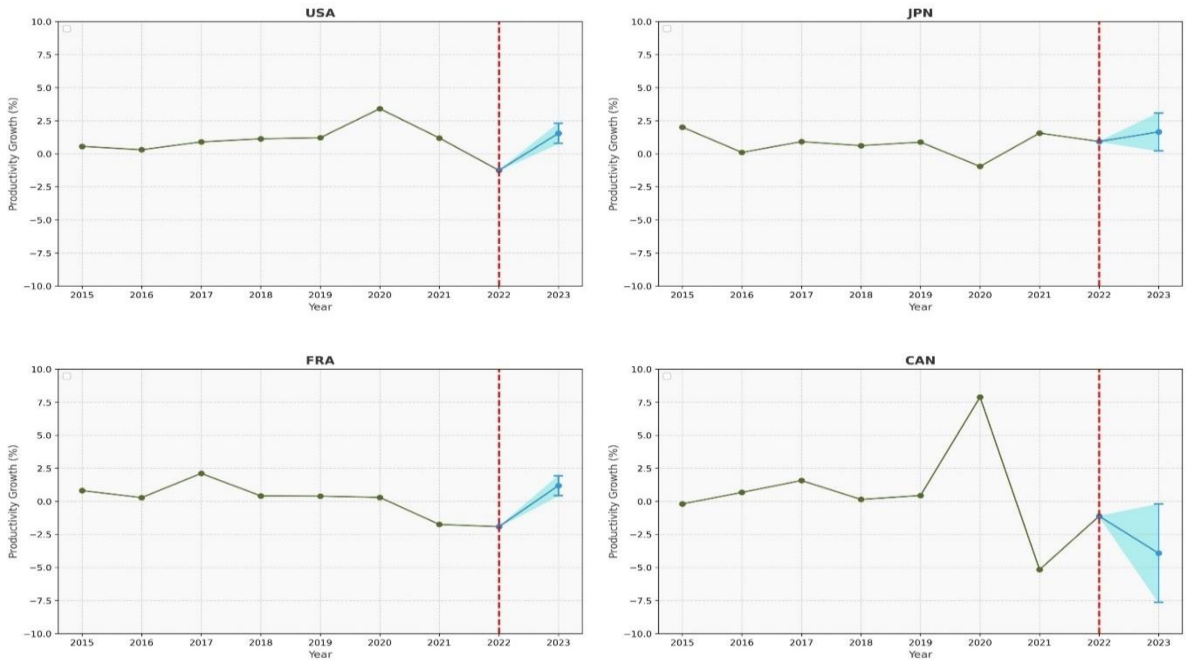
Per cent



Note: Data refers to the unweighted average labour productivity growth. North America includes the United States, Canada and Mexico. Asia contains Korea, Japan, Australia and New Zealand. Europe includes 27 EU member countries. The blue shaded area depicts nowcast for 2023 together with the associated 95% confidence bands.
Source: Luu et al. (forthcoming).

Figure 2.2. Labour productivity growth in selected OECD countries

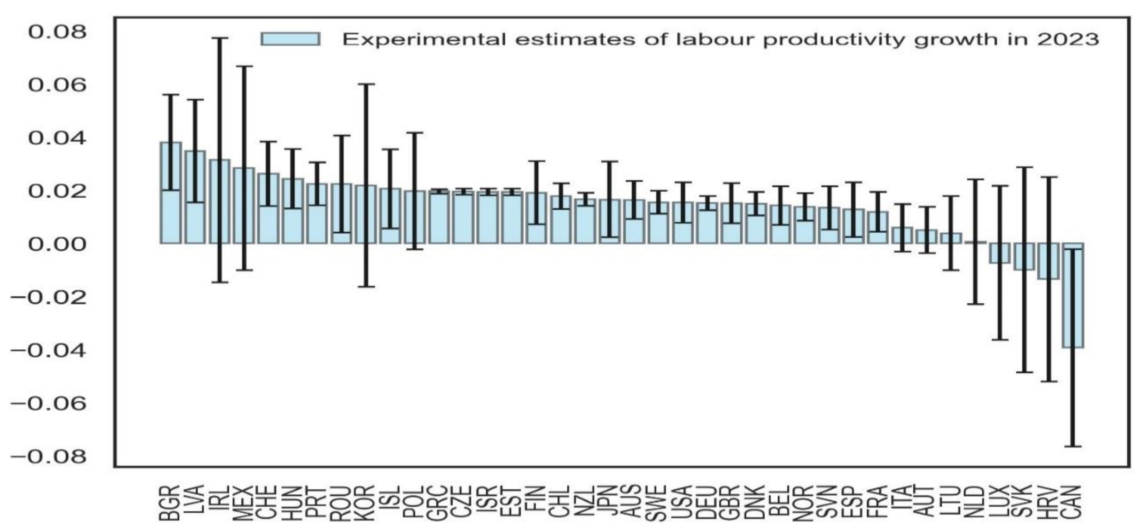
Per cent



Note: The blue shaded area depicts nowcast for 2023 together with the associated 95% confidence bands.
Source: Luu et al. (forthcoming).

Figure 2.3. Labour productivity growth in 2023

Per cent

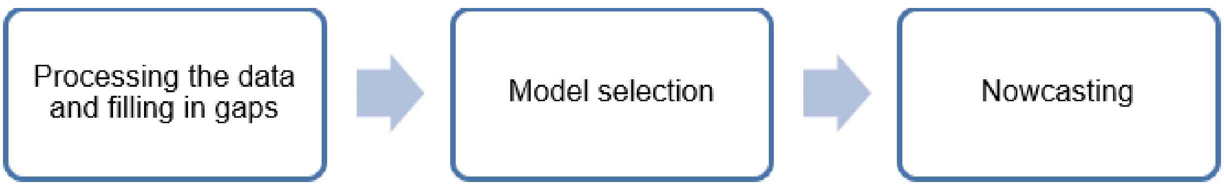


Note: 95% confidence bands are reported.
Source: Luu et al. (forthcoming).

How to read the indicators

Experimental estimates of labour productivity growth have been derived using statistical models (Dynamic Factor Models and machine learning techniques) applied to 38 countries (Figure 2.4). A similar methodology was previously employed for nowcasting trade in value added (Mourougane, 2023[4]). A key specificity of the approach is to run models in a panel setting to mitigate small sample bias, as the target variable (labour productivity growth) is annual and only available for the years 1995-2022. Evidence from the literature suggests that such an approach increases the robustness of results in case of small samples (Woloszko, 2020[5]) (Fosten and Nandi, 2023[6]). In addition, models are estimated in a quasi-real-time – i.e. using only information available before the period that is predicted.

Figure 2.4. Main steps of the empirical strategy



The first step is to collect and process the input data that are used to estimate labour productivity growth. Predictors include national accounts data, labour market indicators, trade and business statistics, and measures of geopolitical risks and uncertainty. Non-stationary data are differenced. Indicators whose predictive accuracy is expected to be high, but which are not sufficiently timely, have been extended using the same methods and model selection criteria as for nowcasting labour productivity growth.

The second step is to select the best model to nowcast labour productivity growth. A range of models have been tested, including dynamic factor models, penalised regressions (Lasso, Ridge as well as Elastic Net), tree-based approaches such as random forest and gradient boosted trees (GBM) as well as a neural network. In addition, a “consensus” model which is the average of all machine learning models and the dynamic factor model is tested. Models are compared to a first-order autoregressive model (AR1), a standard benchmark model in the nowcasting literature. A cross-validation process is implemented to prevent overfitting – i.e. a situation when the model performs well in-sample, but fails in generalising out of sample (Hastie, 2009[7]). The best models are selected based on the root mean squared errors (RMSEs) for one-year ahead predictions.

The last step is to use the best models to nowcast productivity growth in 2023. Note that the model that performs best is selected for each country, (i.e. one best model per country), rather than the model that would perform best on average across all the countries.

Nowcasting models are found to outperform an AR benchmark

The “best” nowcasting models tend to perform better than the AR1 benchmark when performance is measured in terms of one-year ahead RMSE (Table 2.1). Overall, the benchmark model is outperformed for 37 out of the 38 countries. The GBM is selected most often as the best model (for 17 countries), indicating that it has a higher predictive accuracy than the other models. The penalised regressions also display a relatively good performance, while the neural network was chosen in only two instances. The relative performance gain compared to the benchmark AR1 ranged from 9 to 87%, as measured by (1 - relative RMSE) x 100. An additional performance metric, the Forecast Directional Accuracy (FDA) also suggests that nowcasting models predict the direction of annual developments in labour productivity growth in most cases. Indeed, for 37 countries, one-year ahead models predict the accurately the direction of change of productivity growth in at least 63% of the cases.

Table 2.1. Best model selection based on one-year ahead RMSE

	Benchmark AR1	Lasso	Ridge	ElasticNet	Random Forest	Gradient Boosted Trees	Neural network	Consensus	Total number of countries
Number of instances selected as best model	1	1	4	8	1	**17**	2	5	38

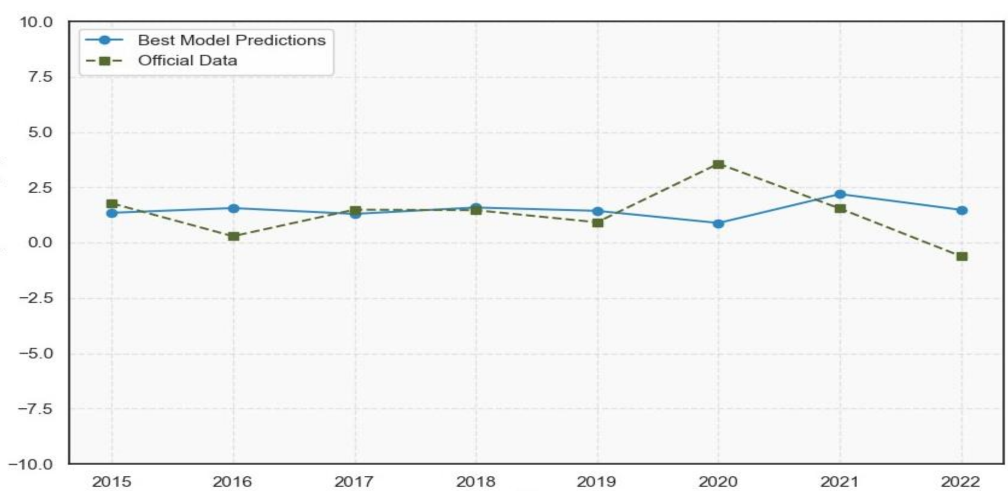
Note: One single model is selected as best for each country. The number of indicator-country instances are shown in the table where selected best models correspond to one of the following statistical models: benchmark AR1, lasso, ridge, elastic net (EN), random forest (RF), gradient boosting tree (GBM), neural network (NN) and consensus. Türkiye is excluded from the sample due to a large share of missing input data.
Source: Luu et al. (forthcoming).

Performance is stable at aggregate and country levels

Overall, the models demonstrate a satisfactory in-sample performance, as assessed by RMSEs, for labour productivity growth (Figure 2.5). Most models do not fully account for the COVID-19 shock, that increased the volatility of the series and led to an artificial increase in productivity growth (see (OECD, 2023[8]) and (OECD/APO, 2022[1])).

Figure 2.5. Model performance across OECD countries

Productivity growth in %

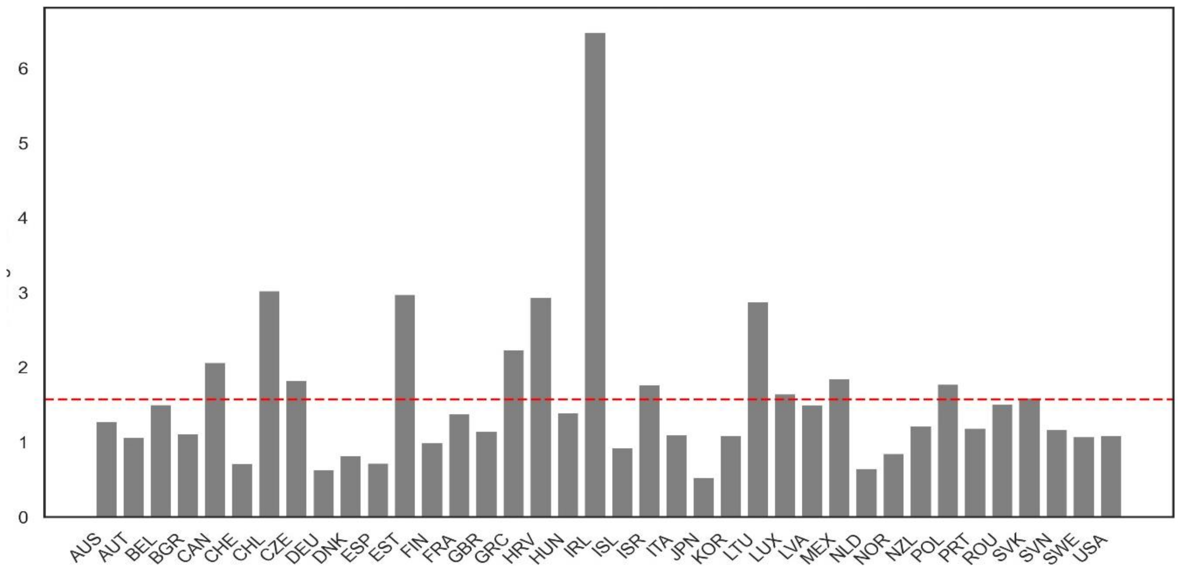


Note: Türkiye is excluded from the sample due to a large share of missing input data.
Source: Luu et al. (forthcoming).

Nowcast performance varies across countries (Figure 2.6). Despite deploying different machine learning algorithms in a panel setting, not all countries performed equally well. Larger economies demonstrated relatively good performance, in particular the United States, Japan, Germany and France, where absolute RMSEs are lower than the average of countries (1 percentage point). Other large economies, such as Italy, the United Kingdom and Korea also display relatively lower RMSEs.

Figure 2.6. In-sample errors are lower in large economies

Average RMSE, percentage points, 2015-2022



Note: Country-average RMSEs were estimated for across all years of the in-sample training period. The horizontal dashed line corresponds to the overall average absolute RMSE (1.6 percentage points). Türkiye is excluded from the sample due to a large share of missing input data.
Source: Luu et al. (forthcoming).

By contrast, a group of economies is harder to nowcast. Ireland stands out particularly, with deviations of around 5 percentage points from the average country RMSE (at 1.6 percentage points). Chile, Canada, Croatia, Estonia, Greece, and Lithuania also present above-average RMSE values.

There are several reasons behind these differences in nowcasting performance. Some countries display highly volatile patterns in labour productivity growth at the start of the COVID-19 crisis, which the models fail to capture accurately, compared to those countries with better prediction performance. In Canada, for instance, labour productivity growth experienced a notable increase in 2020 before falling markedly in the subsequent years. In contrast, in the United States, Australia and many European countries, labour productivity growth was less volatile between 2020 and 2022. Relatively disappointing nowcasting performance also stems from large volatility in productivity growth over the whole period (e.g. Ireland and Croatia). In addition, missing data persist even after pre-processing and could potentially explain poor prediction performance. For Chile, Canada, Croatia, Estonia and Ireland around 10% of observations are imputations.

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3 Cross-country comparisons of labour productivity levels

Context

Productivity is a key source of economic growth and living standards. In this chapter the focus is on labour productivity levels, which are widely used to assess convergence across countries.

The two main components of labour productivity: Gross Domestic Product (GDP) or Gross Value Added (GVA) and hours worked (or when the latter is not available, employment) are discussed in turn.

Size of output

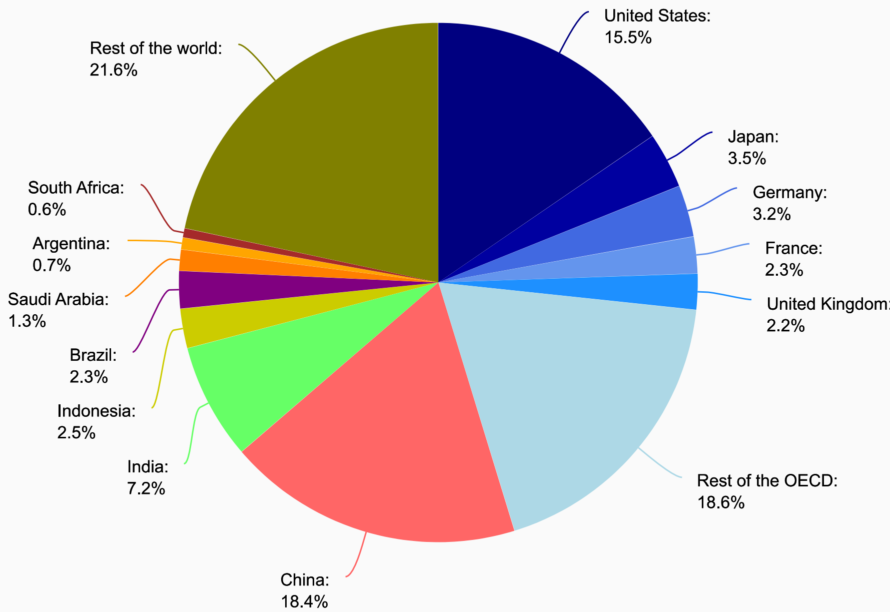
Gross Domestic Product (GDP) is a widely used measure of output in the compilation of productivity indicators. It measures the value added generated by an economy, i.e., the value of goods and services produced during a given period, minus the value of intermediate consumption used in the production process. Countries measure GDP in their own currencies. To compare these estimates across countries, they have to be converted into a common currency. The conversion is often made using nominal exchange rates, but these can provide a misleading comparison of the volume of goods and services produced across countries. A better approach is to use Purchasing Power Parities (PPPs), which are currency converters that control for differences in price levels between countries and so allow for correct international comparisons of the volume of GDP and of the size of economies (Eurostat-OECD, 2024[1]).

Key findings

- **When using PPPs rather than exchange rates as currency converters to US Dollars (USD), the OECD economies together accounted for about 45% of the world GDP in 2022 (**Figure 3.1**).** China (around 18% of world GDP) and India (around 7%) were the largest non-OECD countries.
- **The United States accounted for the largest share (around one third) of PPP converted GDP in 2022 in the OECD area**, followed by Japan, Germany, France, the United Kingdom, Türkiye, Italy and Mexico. The top 3 OECD countries together accounted for about a half of OECD total.

Figure 3.1: Relative size of world economies

Gross domestic product, US dollars, current PPPs, percentage of world total in 2022



How to read the indicators

The compilation of GDP is based on harmonised accounting concepts and definitions that ensure its comparability across countries. In practice, however, the measurement of GDP can be affected by three main issues:

- *The measurement of the non-observed economy*. An exhaustive coverage of production activities can be difficult to achieve in some countries and national estimates may differ in their coverage of non-observed activities. The size of the non-observed economy is generally larger in emerging-market and developing economies reflecting, in part, the higher degree of informal activities and employment.
- *International production arrangements*. In the last decades, globalisation has led to a fragmentation of production processes across countries. In some cases, national accounts record output in the country where intellectual property (IP) assets are located rather than in the country where output is physically produced (e.g., in the case of contract manufacturing). This can lead to a disconnection between GDP and production factors, as well as to changes in GDP due to the relocation of IP assets from one country to another. Moreover, some of the income generated by IP assets may be ultimately transferred abroad. This can happen, for example, when IP assets are located in the balance sheets of affiliates of multinational enterprises which ultimately transfer the related benefits to their parent company (UNECE, 2015[2]). Gross National Income (GNI) is a measure reflecting total income of agents (excluding capital gains and losses) residing in a country, i.e. it accounts for income received by resident agents from abroad and deducts income generated by local production that is transferred to agents residing abroad.
- *The measurement of the digital economy.* The digital transformation also poses many challenges to the measurement of the production of goods and services and hence GDP. The emergence of new digital services, the increasing scale of peer-to-peer interactions through digital intermediary

platforms, the development of “free” services blurring distinction between consumers and producers, are only a few examples of the challenges currently faced by national accountants (Ahmad and Schreyer, 2016[3]) (Ahmad, Reinsdorf and Ribarsky, 2017[4]) (UNECDE, 2023[5]). Moreover, shorter cycles of market entering and exiting of ICT products exacerbate long standing challenges on the distinction between price movements and quality increases (Aeberhardt et al., 2020[6]).

When it comes to the measurement of GDP in volume or real terms (i.e. excluding the impact of inflation), the 2008 System of National Accounts (2008 SNA) recommends the production of estimates based on annually chain-linked volume indices. Most countries covered in the report derive annual estimates of real GDP using annually chain-linked volume indices (i.e. updating every year the prices used to measure volume indices). The United States and Canada use chain-linked Fisher indices while other OECD countries use the chain-linked Laspeyres ones. However, Mexico and South Africa currently produce fixed-base volume indices (i.e. measuring volume indices at the prices of a fixed given period) with the base year updated less frequently.

For further methodological information, consult the *OECD Productivity Statistics – Methodological notes* at https://www.oecd.org/sdd/productivity-stats/OECD-Productivity-Statistics-Methodological-note.pdf.

Hours worked and employment

In productivity analysis, the volume of labour input is most appropriately measured by the total number of hours actually worked, i.e. hours effectively used in production, whether paid or not. The use of total hours worked accounts for variations in working time patterns (e.g. part-time or full-time employment) and employment legislation (e.g. statutory working hours) across countries and over time that can affect the comparability of total employment figures. However, total employment (i.e. the number of persons employed) is often used as a proxy for labour input, particularly when data on total hours worked cannot be estimated.

The relevant concept for measuring labour input is hours actually worked, as opposed to hours paid, contractual hours, or usual hours worked. Hours actually worked reflect regular hours worked by full-time and part-time workers, paid and unpaid overtime, hours worked in additional jobs, excluding time not worked for reasons such as public holidays, annual paid leave, sick leave, maternity leave, strikes, bad weather and economic conditions.

Key findings

- **The United States accounted for about one quarter of both total hours worked and total employment in 2022, the largest shares in the OECD area** (Figure 3.2 and Figure 3.3). However, the ranking of countries in terms of their share in total labour input depends on the measure of labour input used, i.e. hours worked or employment.
- **Estimates of average hours worked per worker differ substantially across countries.** While some countries recorded more than 2000 hours worked per worker in 2022 (such as Colombia, Mexico, Costa Rica and Poland), others recorded less than 1500 hours (Denmark, Germany, Iceland, Luxembourg, the Netherlands and Norway) (Figure 3.4).
- **Differences in average hours worked per worker across countries partly reflect structural differences in the organisation of labour markets. Differences in the method used to measure hours can also play a role in explaining these differences** (Ward, Zinni and Marianna, 2018[7]) (see How to read the indicators for further details).

Figure 3.2: Relative size of the workforce in OECD economies, based on hours worked

Total hours worked in the OECD area, percentage of OECD total in 2022

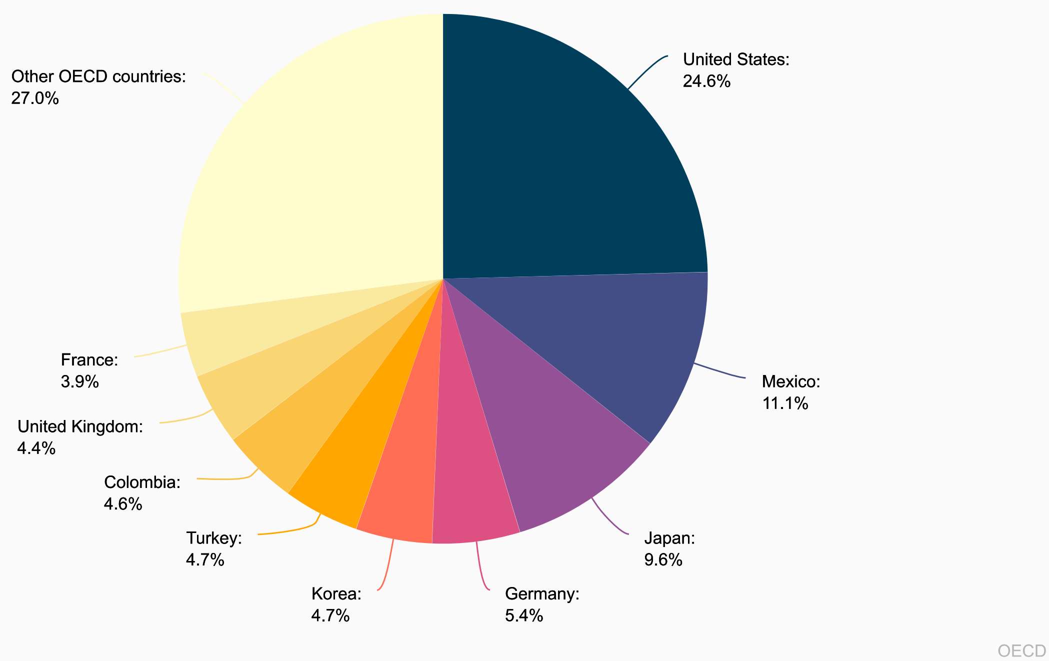


Figure 3.3: Relative size of the workforce in OECD economies, based on employment

Total persons employed in the OECD area, percentage of OECD total in 2022

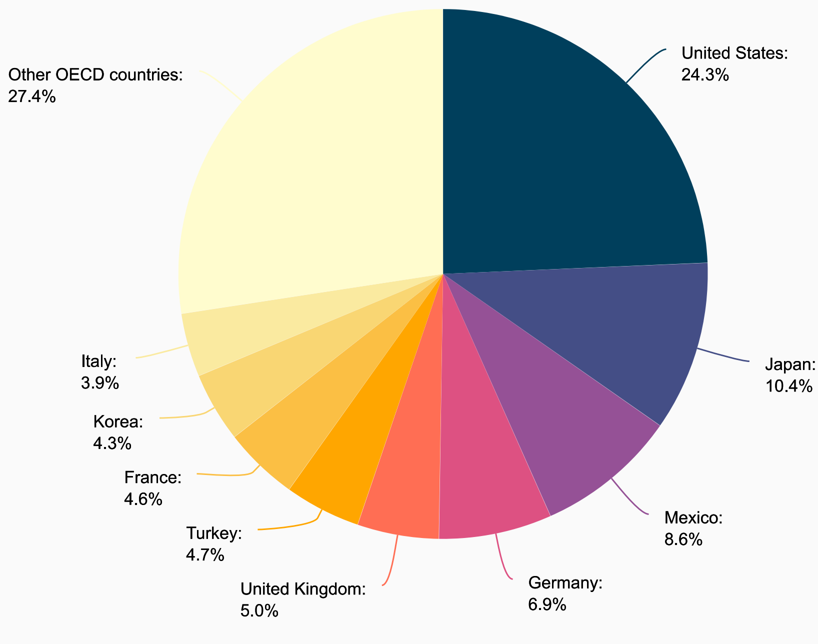
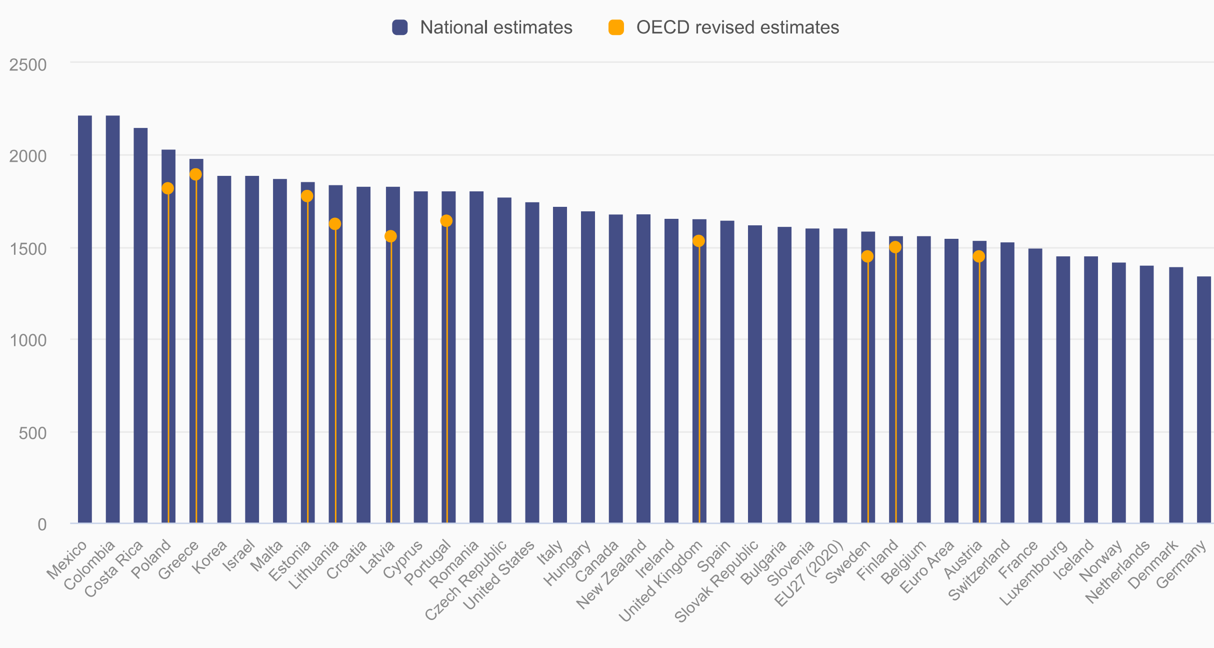


Figure 3.4: Comparison of average hours worked across countries

Average annual hours worked per worker, selected OECD countries, 2022



How to read the indicators

The use of different sources may affect the comparability of labour productivity levels, but comparisons of labour productivity growth are less likely to be affected. In most countries, the main source to construct measures of hours actually worked is the labour force survey. However, many countries rely, only or in addition, on establishment surveys and administrative sources.

Computing estimates of hours worked also implies adjusting the activities covered by employment and hours worked to those covered by the output measure. This requires excluding resident persons working in non-resident production units and including non-resident persons working in resident production units in geographical and economic boundaries of employment and hours worked.

In practice, countries adopt one of two methods to estimate actual hours worked for productivity analysis:

- the direct method, which takes actual hours worked self-reported by respondents in surveys, generally labour force surveys (LFS);
- the component method, which starts from contractual, paid or usual hours per week from establishment surveys, administrative sources or the LFS, with subsequent adjustments for absences and overtime, and other adjustments to align hours worked with the concepts of hours actually worked and the concept of domestic output.

The direct method is relatively simple, but it depends heavily on respondent recall, cannot account for response bias, and assumes perfect alignment of measures of workers and output. The component method systematically attempts to address these issues, though it is more complex. Response bias and insufficient adjustments to align with the concept of domestic output can lead to systematic upward biases in estimates of average hours worked per worker based on the direct approach, compared to the component approach (Ward, Zinni and Marianna, 2018[7]).

The OECD simplified component method assumes that workers in all countries take on average all the leave to which they are entitled. However, actual take-up leave rates are likely to reflect differences in working cultures across countries. In addition, the national statistics offices may have access to a wider variety of national data sources. As a result, the OECD simplified component method estimates can be considered only as a stopgap for those countries currently using a direct approach with minimal or no adjustments, while these countries work towards improving their methodologies.

The effective quantity of labour input depends not only on the total number of hours actually worked, but also on the education, working experience, business functions and other workers' characteristics. The measure of labour input used in this publication, i.e. total hours worked, does not account for the composition or "quality" of the workforce and likely underestimates the effective contribution of labour to production.

For further methodological information, consult the *OECD Productivity Statistics – Methodological notes* at https://www.oecd.org/sdd/productivity-stats/OECD-Productivity-Statistics-Methodological-note.pdf.

Labour productivity

Labour productivity is the most frequently computed productivity indicator. It represents the volume of output produced per unit of labour input. The ratio between output and labour input depends to a large extent on the presence of other inputs, such as physical capital (e.g. buildings, machinery and transport vehicles) and intangible assets used in production (e.g. intellectual property assets), technical efficiency and organisational change.

Intangible assets play an increasingly important role in economic growth and productivity. Several important intangible assets are part of measured capital, in particular research and development, software and intellectual property products. There are measurement challenges related to the recording of capital services from intellectual property assets consistent with the location where output is produced. Intellectual property assets may also give rise to large income transfers between the countries where they are registered, and those of their ultimate owners, thus leading to a large gap between GDP and GNI (Gross National Income; see the section on the Size of output). In such cases, measures of GNI per hour worked can complement measures of GDP per hour worked.

Key findings

- **There are large disparities in labour productivity levels across countries, including within the OECD area.** Measured as GDP per hour worked in PPP terms, average labour productivity in the OECD area was USD 67.5 per hour in 2022, with a standard deviation across countries of about USD 32. Labour productivity was more than twice the OECD average in Ireland and Norway, and about one third of the OECD average in Mexico and Colombia (Figure 3.5).
- **Labour productivity levels across OECD countries have converged since 2000, especially among the catching-up countries.** Most of the countries with labour productivity levels below the OECD average in 2000 have caught up considerably since then. Labour productivity levels in Canada, France, Italy, the Netherlands and the United Kingdom were still above average, but closer to the OECD average in 2022 than in 2000. However, the gap with the OECD average increased for Greece, Israel, Japan, Mexico and New Zealand over the last 20 years (Figure 3.6).
- **In most countries, GDP per hour worked and GNI per hour worked are similar, as the underlying income flows are relatively small or offset each other**. Ireland, Luxembourg and Norway, on the other hand, show significant differences between measures based on GDP and GNI, reflecting the important role of multinationals in output and income transfers. In such cases, measures using GNI are useful complements to measures based on GDP (Figure 3.7).

Figure 3.5: Labour productivity in 2022

GDP per hour worked, current prices and current PPPs

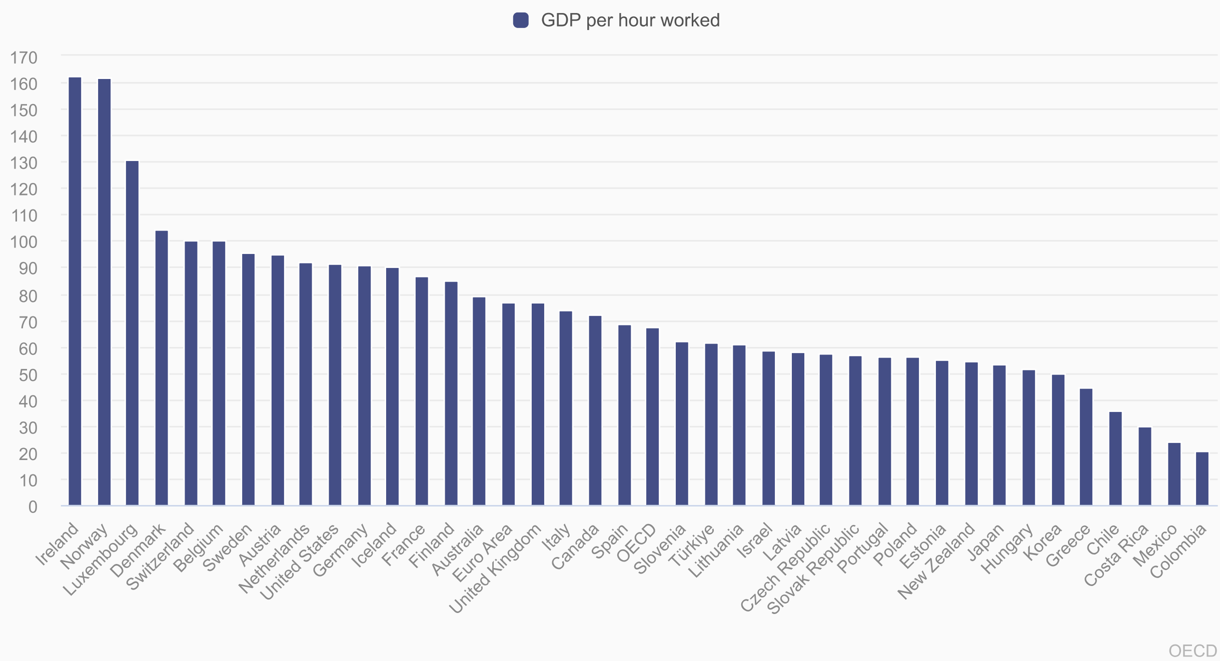


Figure 3.6: Labour productivity dispersion

Percentage point difference from the OECD (OECD=0), current prices and current PPPs

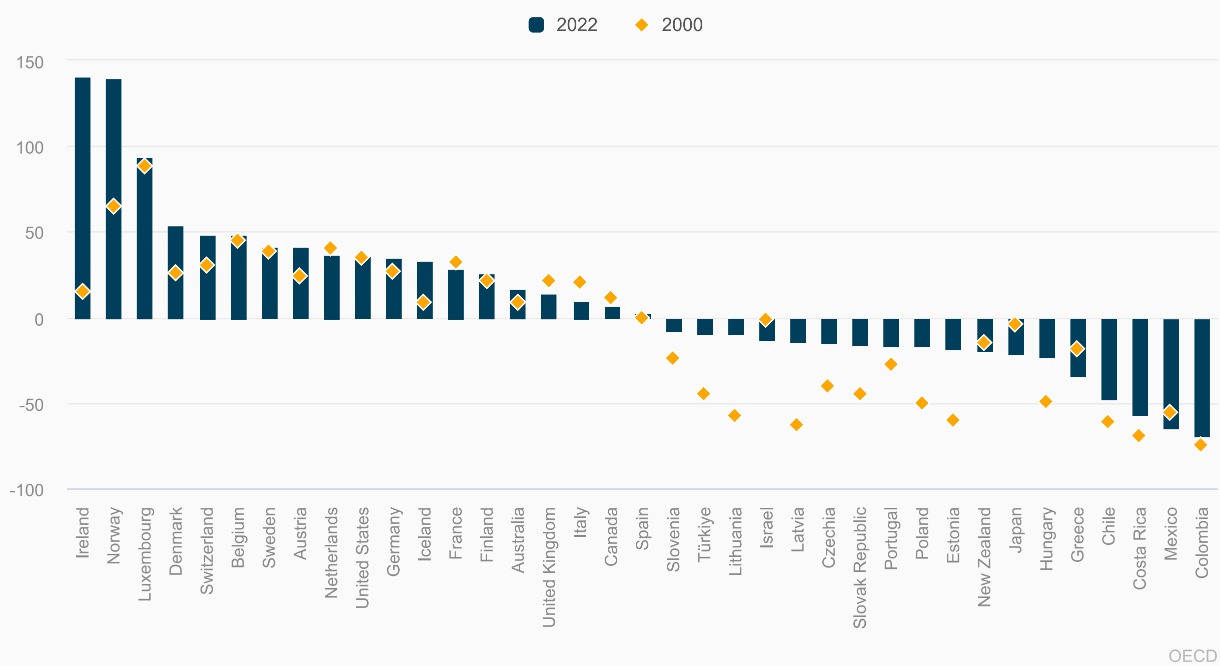
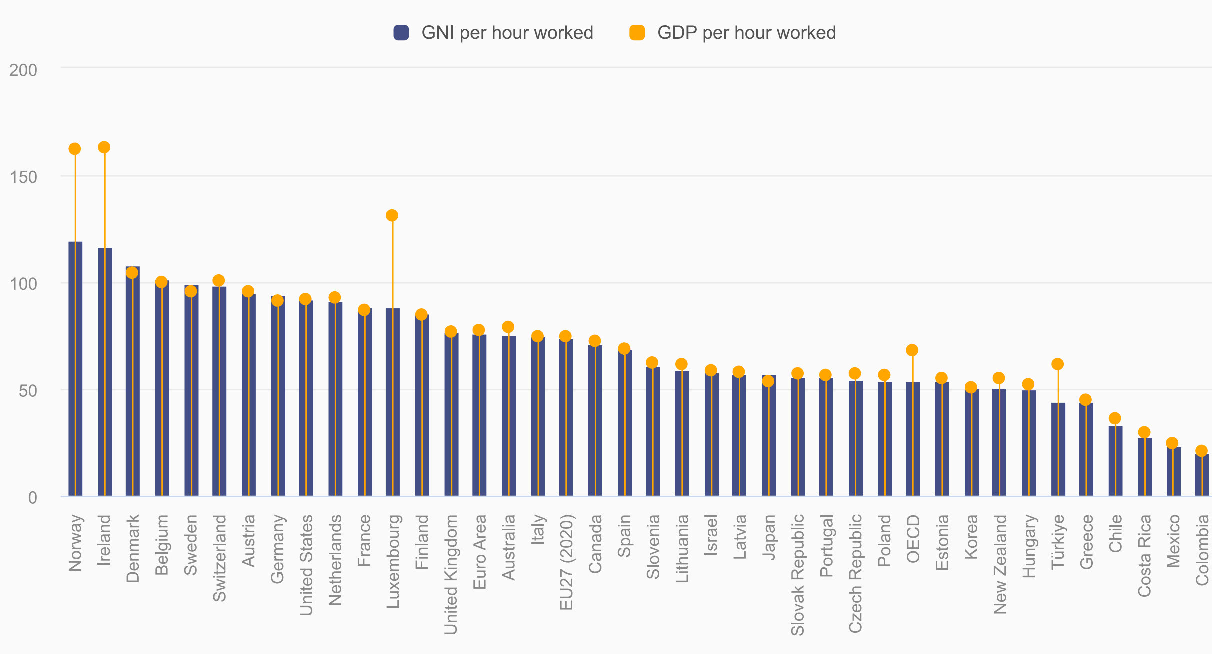


Figure 3.7: Labour productivity comparison across countries

GDP per hour worked and GNI per hour worked, current prices and current PPPs, 2022



How to read the indicators

Following national accounts standards, and consistently with the measure of output, the measure of labour input in an economy includes the contribution of cross-border workers working in resident production units. Conversely, it excludes all persons working in non-resident production units. Depending on the original data sources used to estimate employment (e.g. labour force survey, administrative data, business statistics), various adjustments are needed to ensure consistency between labour and output measures.

In the above charts, national accounts data on hours worked for Austria, Estonia, Finland, Greece, Latvia, Lithuania, Poland, Portugal, Sweden and the United Kingdom have been replaced with estimates obtained with the OECD simplified component method described in the section on Hours worked. However, the impact of this correction on labour productivity growth rates is marginal (Ward, Zinni and Marianna, 2018[7]).

Some countries can be classified as investment hubs (with a relatively high stock of foreign direct investment). In this case, the difference between GDP and GNI of the hub country depends on whether enterprise headquarters are located in the country or not. If an affiliate is established in an investment hub but headquarters remain abroad, GNI should not be affected by profit shifting behaviour. Conversely, if headquarters are set up in the investment hub whose profits are artificially inflated, GNI will remain high, in line with GDP, unless profits are actually transferred abroad as dividend payments – then GNI would be reduced (Deaton and Schreyer, 2021[8]).

For further methodological information, consult the *OECD Productivity Statistics – Methodological notes* at https://www.oecd.org/sdd/productivity-stats/OECD-Productivity-Statistics-Methodological-note.pdf.

Data sources

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4 Productivity and economic growth

Context

A number of shocks have hit the global economy in the past few years. They have led to a business environment of heightened inflation, tightened financial conditions, weakened trade linkages and increased uncertainties, threatening economic and productivity growth.

This is happening in a context of sluggish productivity growth over the last two decades in many OECD economies. The slowdown in productivity preceded the global financial crisis in some countries and occurred at a time of significant technological change, with increasing diffusion of digital technologies in the 2000s. This has been referred to as the productivity paradox and several views have been put forward to explain it:

- **Limited transformative nature and scale of today's technological breakthroughs compared with those that took place in the past.** The benefits from electricity, internal combustion engines, the invention of telephone and radio, spread out through the economy over many years. Recent innovations, such as ICT, although also revolutionary, have shown more rapid adoption and a shorter-lived impact on productivity and economic growth (Cowen, 2011[1]) (Gordon, 2012[2]).
- **A breakdown of the diffusion machine.** Some studies suggest that an important explanation for the productivity slowdown is the slowing pace at which innovations spread from the most globally advanced firms to the rest of the economy (OECD, 2015[3]) (Andrews, Criscuolo and Gal, 2016[4]). In addition, low managerial quality and the lack of ICT skills can curb the adoption of digital technologies and the rate of diffusion (Andrews, Nicoletti and Timiliotis, 2018[5]), and OECD work on *The Human Side of Productivity* shows that more productive firms tend to employ a larger share of skilled employees and operate with a larger share of managerial roles (OECD, 2019[6]) (Criscuolo et al., 2021[7]). Financing constraints specific to intangible assets, that help to enable the adoption and diffusion of technologies, may also play a role (Demmou and Franco, 2021[8]).
- **Sectoral changes.** The long-term shift from manufacturing to services, in particular the shift to lower-productivity personal services, may help explain the longer-term decline in productivity growth across (developed) economies. Demographic changes and more service-oriented consumption patterns, notably from ageing populations, may exacerbate this effect. Nevertheless, several studies conclude that the impact of this phenomenon is limited so far (Barnett et al., 2014[9]) (Kierzenkowski, Machlica and Fulop, 2018[10]) (Riley, Rincon-Aznar and Samek, 2018[11]) (Sorbe, Gal and Millot, 2018[12]) (Mourougane and Kim, 2020[13]). See Chapter 5 on Industry contributions to aggregate labour productivity growth in this publication for a more detailed discussion on the impact of reallocations across industries on aggregate labour productivity developments.
- **Measurement.** Several measurement challenges can limit the analysis of recent productivity trends. Many of them relate to the measurement of factors of production and output, and especially the distinction between price and volume changes. New forms of doing business, driven by digitalisation, the sharing economy, and the increasing importance of knowledge-based assets, have added new measurement challenges and exacerbated the long-standing ones. While the jury is still out on the

underlying causes, a growing body of evidence has suggested that measurement, or rather “mismeasurement”, is not the cause of the observed productivity slowdown (Syverson, 2017[14]) (Byrne, Fernald and Reinsdorf, 2016[15]) (Ahmad and Schreyer, 2016[16]) (Ahmad, Ribarsky and Reinsdorf, 2017[17]), though there are also studies suggesting some form of mismeasurement related in particular to intangible assets may indeed exist (Brynjolfsson, Rock and Syverson, 2021[18]).

Looking ahead, several megatrends such as ageing, and the green and digital transitions may impact productivity in the medium term. Their effects on economic performance remain to be seen. For instance, the green transition and policies underpinning it may impede economic performance over the medium term, but they could also boost it by inducing innovation in clean technologies (Dechezleprêtre and Kruse, 2018[19]).

The surge in generative Artificial Intelligence has also opened up new prospects for the future of productivity, but its economic impact and how it will affect different groups of workers and sectors, are uncertain (Autor, 2022[20]) (OECD, 2023[21]).

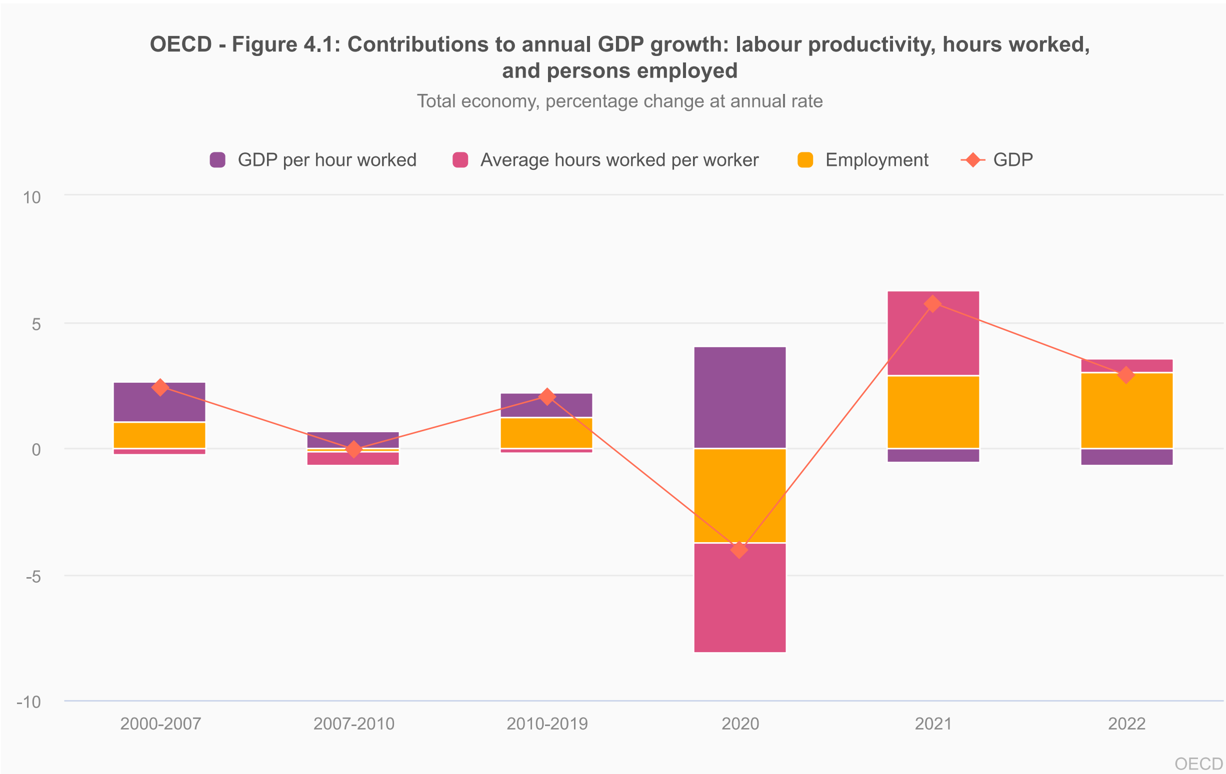
GDP growth: contributions from employment, hours worked per worker, and labour productivity

Productivity gains reflect the ability to produce more output by better combining inputs, owing to new ideas, technological breakthroughs and augmented business models. These transform the production of goods and services, fostering economic growth and rising living standards and well-being.

Key findings

- **While 2021 saw a rapid recovery in GDP, the majority of countries experienced a growth slowdown in 2022**, with an OECD average of 2.9% compared to 5.7% in the previous year. Chile, Estonia and Luxembourg had the sharpest downswing relative to 2021, and in Estonia GDP growth even turned negative. Only Austria, Iceland and Portugal experienced faster GDP growth in 2022 than in 2021.
- **Growth in the number of persons employed was the main positive contributor to GDP growth in most OECD countries in 2022 (**Figure 4.1**).**
- **The contribution to GDP growth from labour productivity fell in 20 OECD economies in 2022. This suggests that some proportion of the new jobs created in 2022 were in lower-productivity jobs**. As described in more detail in Chapter 5, this is to a certain extent due to reversal of reallocation effects that took place during the pandemic. Contact-intensive and typically less productive sectors, such as hospitality services, have recovered, while some other low-productivity activities, such as mining and utilities, also expanded, especially in Europe.

Indicators



Compare: https://www1.compareyourcountry.org/compendium-productivity-indicators-2024/en/2/6169/default/all/FRA+USA?embed=noHeaderNoNav.

How to read the indicators

In the charts above, national accounts figures on hours worked for Austria, Estonia, Finland, Greece, Latvia, Lithuania, Poland, Portugal, Sweden and the United Kingdom have been replaced with estimates obtained with the OECD simplified component method described in the section on Hours worked and employment of Chapter 3. However, the impact of this correction on labour productivity growth rates is marginal (Ward, Zinni and Marianna, 2018[22]).

For further methodological information, consult the *OECD Productivity Statistics – Methodological notes* at https://www.oecd.org/sdd/productivity-stats/OECD-Productivity-Statistics-Methodological-note.pdf.

GDP growth: contributions from labour, capital and multifactor productivity

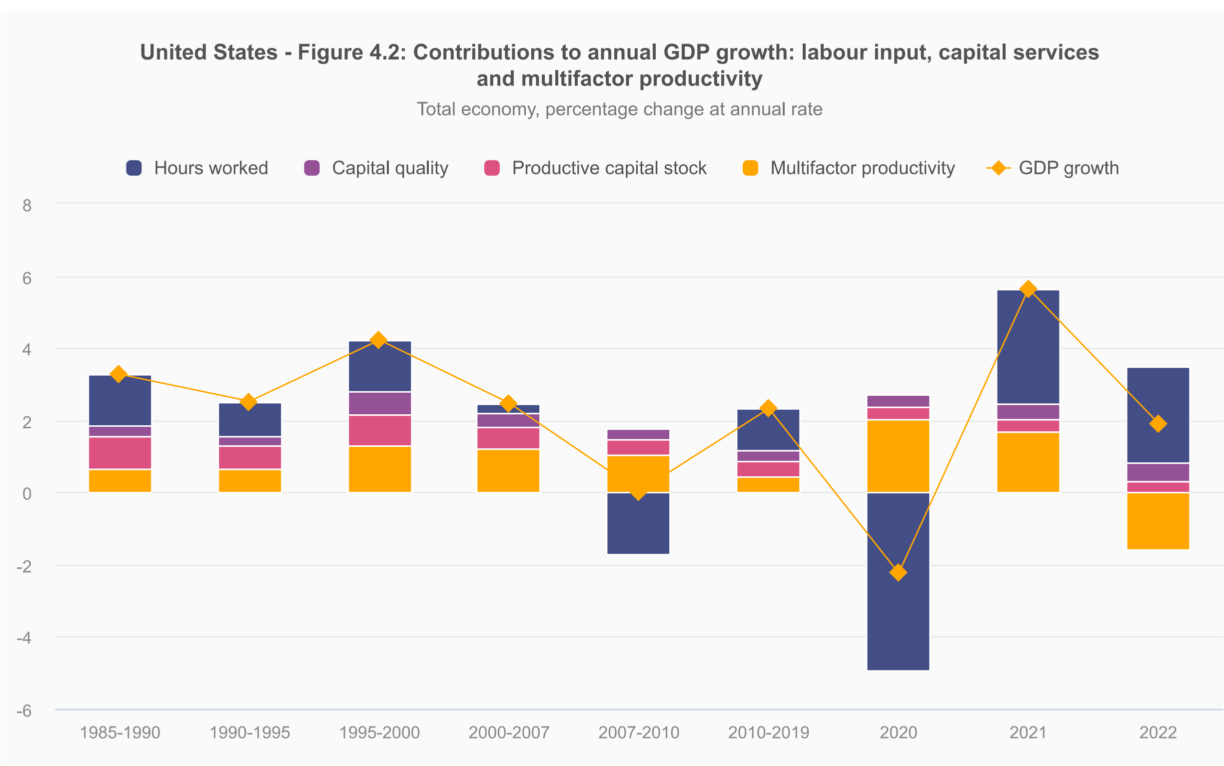
Economic growth can either stem from raising the labour and capital inputs used in production, or from improving the overall efficiency with which these inputs are combined, meaning higher multifactor productivity (MFP) growth. Growth accounting decomposes total output growth, measured here as GDP growth, into these three components and provides a useful tool to identify the underlying drivers of economic growth.

The contribution of labour (capital) to GDP growth is measured as the growth in labour (capital) input, multiplied by the share of labour (capital) in total costs of production. In the figures below, the contribution of capital to GDP growth is further broken down to highlight the contribution made by changes in the volume of the productive capital stock used in production and gains from changes in the composition of capital (i.e., capital quality). The sum of the contributions from the productive capital stock and capital quality is the overall contribution of capital services to GDP growth.

Key findings

- When contributions to GDP growth are analysed in the growth accounting framework, **changes in labour input, measured as total hours worked, stand out as the main driving force of GDP growth in almost all OECD countries in 2022 (**Figure 4.2**).** However, the contribution of hours worked was in many countries lower than in 2021.This was particularly the case in Belgium, Canada, Greece, Italy and the United Kingdom.
- **Productive capital stock and capital quality contributed relatively little to GDP growth in 2022**, with a few exceptions, such as Israel, Korea, Norway, New Zealand, Sweden and the United States.
- **The post-COVID recovery in multifactor productivity observed in 2021 was not sustained, as it contributed significantly less to GDP growth in 2022 in most OECD countries**. In some countries, the contribution of multifactor productivity to growth was even negative, as in Australia, Belgium, Canada, Denmark, France, Korea, Luxembourg, Norway, New Zealand, Sweden and the United States.

Indicators



Compare: https://www1.compareyourcountry.org/compendium-productivity-indicators-2024/en/2/6171/default/all/FRA+USA?embed=noHeaderNoNav.

How to read the indicators

For productivity analysis, the appropriate measure of capital input is the flow of capital services, i.e. the flow of productive services that can be drawn from the capital stock. This productive capital stock is the cumulative stock of past investments in capital assets adjusted for the losses in their productive capacity (or efficiency) and retirement (Schreyer, Bignon and Dupont, 2003[23]). Conceptually, capital services should not be confused with the value of capital that is measured by the net wealth capital stock. For example, the capital services provided by a taxi relate to the number of trips, distance driven, and comfort of the taxi, rather than the market value of the vehicle, which would instead relate to the net wealth capital stock concept. These services are estimated using the rate of change of the productive capital stock of different capital goods and aggregated using rental prices or user costs shares as weights (as opposed to market price shares used to aggregate net wealth capital stocks).

Countries use different approaches to deflate investment in information and communication technologies (ICT) assets (i.e. computer hardware, telecommunications equipment, and computer software and databases), where constant-quality price changes are particularly important but difficult to measure. Moreover, they tend to use different depreciation and retirement profiles for all assets (Pionnier, Zinni and Baret, 2023[24]). To adjust for potential measurement differences, the OECD estimates productive capital stocks and computes aggregate measures of capital services using a set of harmonised ICT investment deflators as well as common depreciation rates and retirement profiles for all assets across countries (Schreyer, 2002[25]) (Schreyer, Bignon and Dupont, 2003[23]).

MFP growth is measured as a residual, i.e., by the part of GDP growth that cannot be explained by the contributions of labour and capital inputs to GDP growth. Traditionally, MFP growth is seen as a measure of technological change but, in fact, technological change can also be embodied in factor inputs, e.g. improvements in design and quality between two vintages of the same capital asset. In practice, MFP only captures disembodied technological change, e.g., network effects or spillovers from production factors, the effects of better management practices, organisational change and improvements in the knowledge base. Moreover, MFP picks up other factors such as adjustment costs, economies of scale, effects from imperfect competition, variations in capacity utilisation (if not captured by the capital input measures), and errors in the measurement of output, inputs and input weights. For instance, increases in educational attainment or a shift towards a more skill-intensive production process, if not captured by labour input measures (i.e. labour services) will end up in measured MFP. Therefore, accurate estimates of output and input measures is key to get a reliable measure of MFP.

In the above charts, national accounts figures on hours worked for Austria, Estonia, Finland, Greece, Latvia, Lithuania, Poland, Portugal, Sweden and the United Kingdom have been replaced with estimates obtained with the OECD simplified component method described in the Section on Hours worked and employment of Chapter 3. However, the impact of this correction on labour productivity growth rates is marginal (Ward, Zinni and Marianna, 2018[22]).

For further methodological information, consult the *OECD Productivity Statistics – Methodological notes* at https://www.oecd.org/sdd/productivity-stats/OECD-Productivity-Statistics-Methodological-note.pdf.

Contributions to labour productivity growth

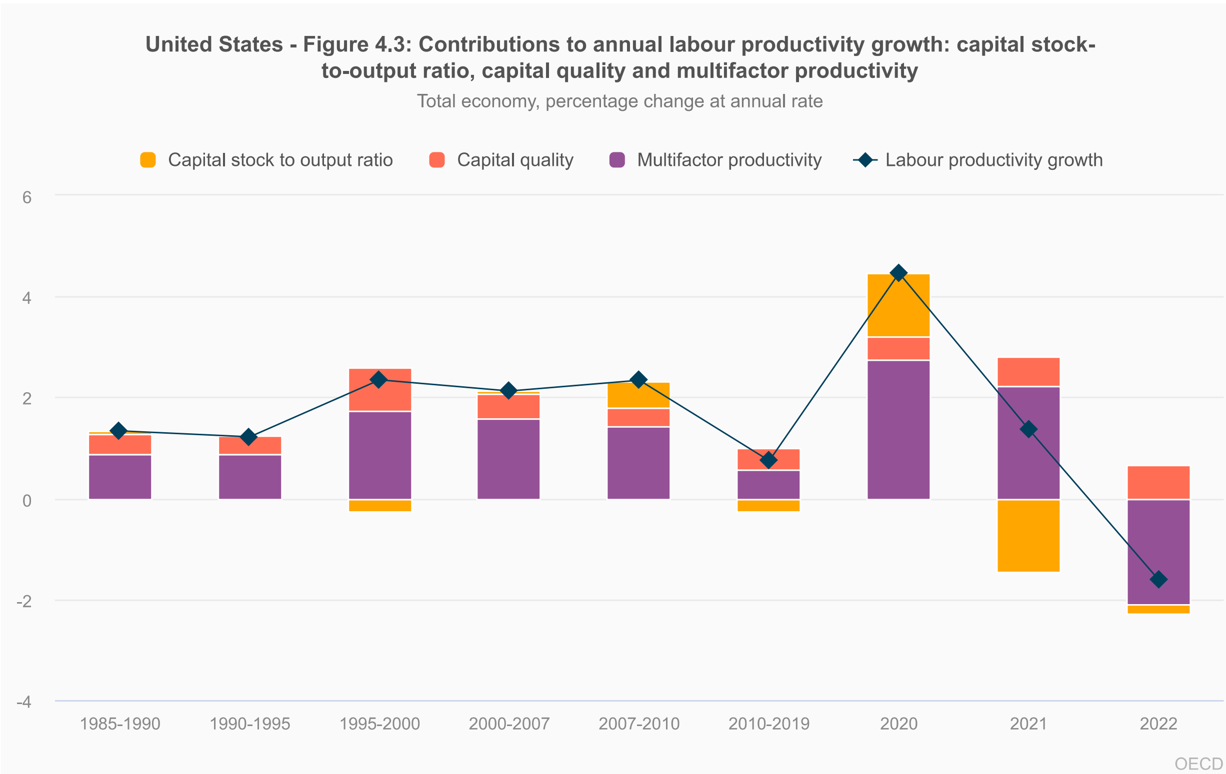
Labour productivity growth measures changes in the volume of output for a given volume of hours worked. Higher levels of labour productivity can be achieved if more capital is used in production, if capital quality increases, and if labour and capital are used together more efficiently, which means higher multifactor productivity growth (MFP).

By reformulating the growth accounting framework described in the previous section, labour productivity growth can be decomposed into the contributions of capital and MFP. In the figures below, the contribution of capital to labour productivity growth is further broken down to highlight the contribution of changes in the capital stock-to-GDP ratio and in the composition of capital, often referred to as capital quality.

Key findings

- **The evolution of the capital stock-to-output ratio contributes to aggregate labour productivity growth in a countercyclical way**. It increases during economic downturns and declines during economic rebounds, as capital stock moves more slowly than GDP. During periods of stable economic growth, its contribution is typically small. Changes in capital quality (i.e. change in the composition of capital) tend to have a small and stable contribution to aggregate labour productivity growth.
- **MFP growth is usually the main driver of labour productivity growth, but, over the course of the last two decades prior to the COVID-19 crisis, its contribution has been declining in most countries**, particularly in Greece, Ireland, Italy, Spain, the United Kingdom and the United States.
- **During and after the COVID pandemic, over 2020-2022, many countries recorded a hump-shaped evolution of MFP contributions to labour productivity growth:** a negative contribution in 2020, followed by an increase in 2021, and a decrease (or even a negative contribution again) in 2022. However, several countries, including Australia or the United States, recorded positive MFP contributions during 2020 or even 2021, before diminishing or turning negative in 2022.
- Tighter monetary policy and higher real interest rates, higher energy prices, weak household income growth and declining confidence have discouraged companies from making longer-term investments in 2022 (OECD, 2022[26]), which is reflected in **a negative contribution of capital stock-to-output ratio in OECD countries for the second consecutive year.**
- **Capital quality made a relatively small but positive contribution to labour productivity growth in most countries in 2022 (**Figure 4.3**).** Sweden, the United States, Switzerland, Denmark, New Zealand and France were the OECD countries with the highest capital quality contributions in 2022. Finland and Ireland recorded a small negative contribution from capital quality in 2022.
- **Ireland is an exception among OECD countries, with a positive contribution from multifactor productivity to labour productivity growth each year between 2020 and 2022. During the same period, labour productivity growth slowed down in Ireland**, reaching 0.8% in 2022, with large negative capital stock-to-output contributions over 2021-22. This evolution seems to be driven by multinational enterprises, as the MFP of the domestic sector in Ireland was relatively flat during 2020-22, while the foreign one kept rising (Central Statistics Office, 2023[27]). This is in line with documented labour productivity gaps between the domestic and foreign sectors in Ireland (Papa, Rehill and O'Connor, 2018[28]), with so far limited productivity spillovers from the latter to the former (Di Ubaldo, Lawless and Siedschlag, 2018[29]).

Indicators



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How to read the indicators

As explained in the previous section, the OECD estimates capital stocks and computes capital services using a set of harmonised ICT investment deflators as well as the same depreciation rates and retirement profiles for the different assets across countries (Schreyer, 2002[25]) (Schreyer, Bignon and Dupont, 2003[23]). OECD also applies a consistent methodology to estimate MFP growth.

In the above charts, national accounts data on hours worked for Austria, Estonia, Finland, Greece, Latvia, Lithuania, Poland, Portugal, Sweden and the United Kingdom have been replaced with estimates obtained with the OECD simplified component method described in the Section Hours worked and employment in Chapter 3. However, the impact of this correction on labour productivity growth rates is marginal (Ward, Zinni and Marianna, 2018[22]).

For further methodological information, consult the *OECD Productivity Statistics – Methodological notes* at https://www.oecd.org/sdd/productivity-stats/OECD-Productivity-Statistics-Methodological-note.pdf.

Data sources

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OECD Employment and Labour Market Statistics (database), http://dx.doi.org/10.1787/lfs-data-en.

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5 Industry contributions to aggregate labour productivity growth

Context and key findings

This chapter builds upon the research presented in the 2023 edition of the Compendium of productivity indicators, on within-industry labour productivity developments and between-industry reallocation of hours worked during the first years of the COVID-19 pandemic. It incorporates information up to 2022.

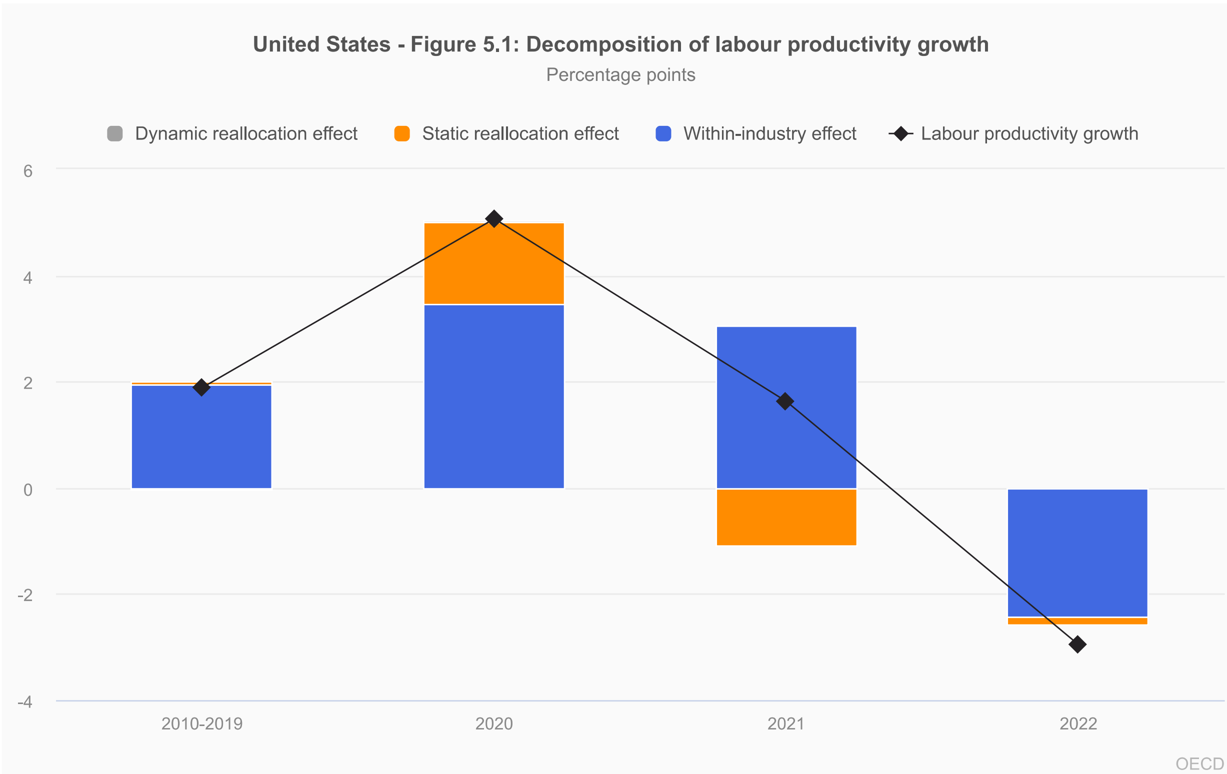
The aggregate productivity growth in this chapter refers to the growth of the total economy, excluding real-estate, public administration and defense, education, and health activities. Labour productivity developments at the industry level are broken down into between-industry reallocation and within-industry productivity developments (within-industry effect).

Between-industry reallocations of hours worked are the sum of reallocations between industries with different productivity levels (static reallocation effect) and between industries with different productivity growth rates (dynamic reallocation effect). The static effect usually dominates the dynamic effect.

The within-industry effect reflects labour productivity developments that are not the result of reallocation of hours worked between industries. It is measured by the labour productivity growth in each industry weighted by the industry share in total value added. It can be affected by a variety of factors, including changes in the intensity with which industries use skilled labour and capital, their capacity to innovate, and their exposure to competition and knowledge sharing through their participation in international trade and global value chains. Even though the within industry effect can also potentially result from resource reallocation on a more disaggregated level, between firms, the aggregation level of data used in this chapter does not make it possible to infer the extent of this more disaggregated reallocation.

Key findings

- **In 'normal' times outside large contractions of the economy, reallocations of hours worked between industries only play a limited role in explaining aggregate labour productivity growth.** A more significant and positive reallocation effect on labour productivity growth is usually observed during recessions (Figure 5.1).
- The COVID-19 recession was no exception and **the scale of the overall reallocation effect between industries in 2020 was unprecedented**. It largely contributed to the rebound in aggregate labour productivity growth that was observed in most countries in 2020.
- **Information from 2021 and 2022 suggests that the impact of the pandemic-induced disruptions was temporary.** In most countries with data, the absolute contribution of the within-industry effect to labour productivity growth gained weight relative to the between-industry reallocation effects. Both effects often reduced productivity growth in 2022. The between-industry reallocation effect shrank or even turned negative. The within-industry effect mostly evolved in the same direction as labour productivity growth, so that it was negative in many countries.



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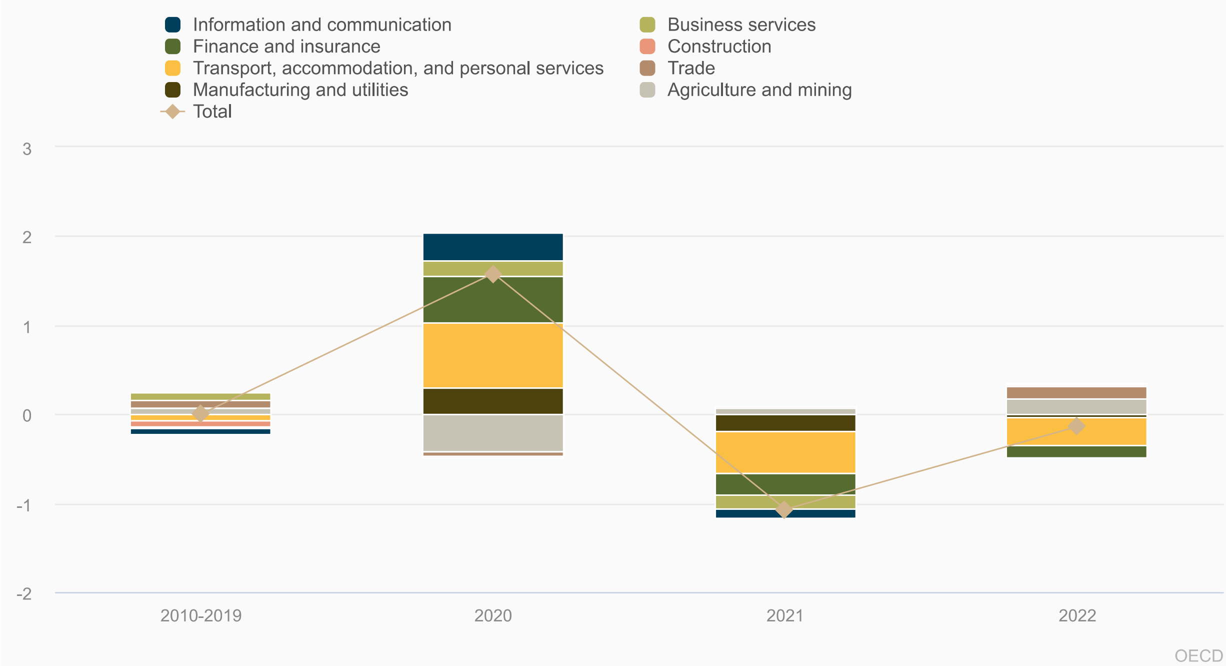
Reallocations between industries contributed negatively to productivity growth in 2022

- The limited overall reallocation of hours worked between industries during normal economic circumstances is often the result of contributions with opposite signs (Figure 5.2). A positive (resp. negative) reallocation effect happens when resources move from industries with lower (resp. higher) productivity towards more (resp. less) productive ones.
- Between-industry reallocations of hours worked during the COVID-19 pandemic were unusually high compared to the pre-pandemic era. However, these effects started to dissipate and, in some instances, even turned negative in several OECD countries over 2021-22.
- In most countries for which the data is available in 2022, reallocation of hours worked contributed negatively to labour productivity growth. Belgium experienced the most significant decline in the overall reallocation effect as compared with the COVID-19 period, followed by Czechia and Sweden. On the other hand, the reallocation effect was positive, though small in Estonia, Greece and Portugal.
- The decline in the contribution of between-industry reallocation of hours worked to productivity partly stems from the post-COVID economic recovery. Industries hardest hit by the COVID-19 recession – such as accommodation and restaurants or personal services typically characterised by lower productivity – have recovered, leading to reallocation of hours worked to these sectors. On the other hand, reallocation to high-productivity sectors that grew rapidly in 2020, such as financial and insurance activities and ICT, was small or even negative in 2022.

Indicators

United States - Figure 5.2: Industry contributions to overall reallocation effect

Percentage points



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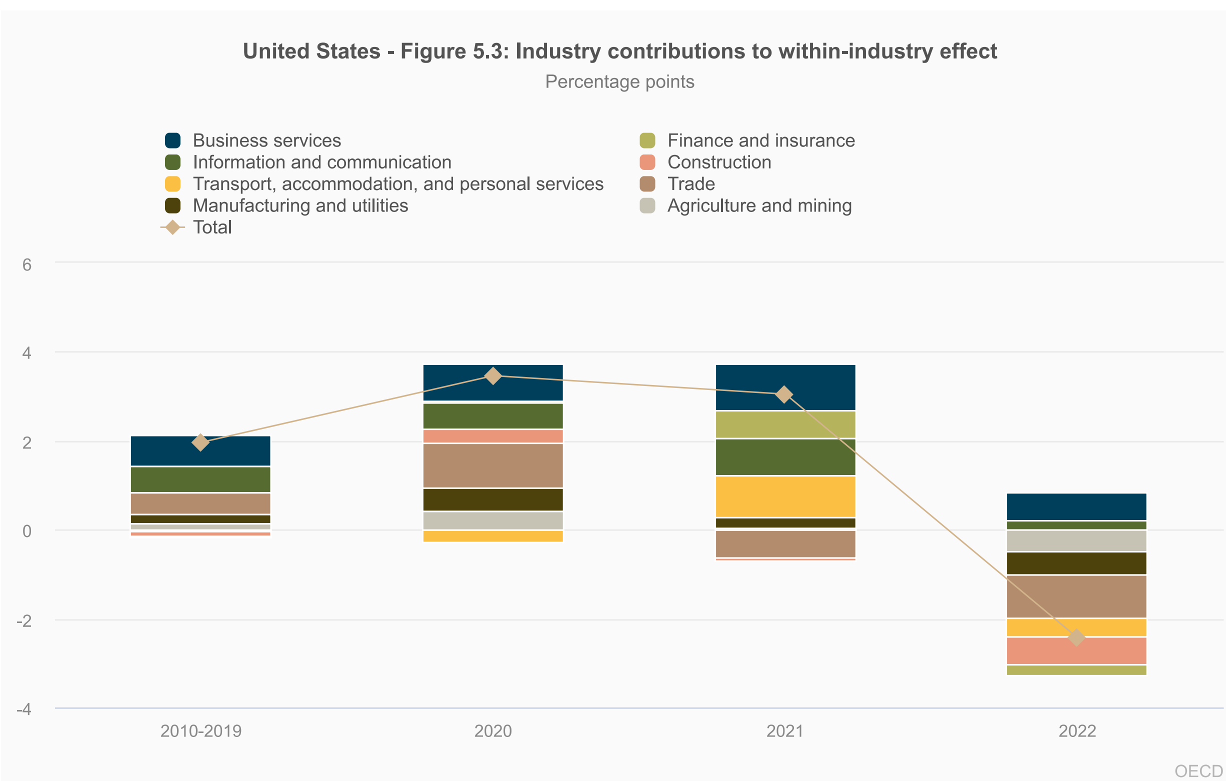
Within-industry developments explain most of the slowdown in productivity growth

- In 2022, within-industry contribution to productivity growth declined and even turned negative in many OECD countries, after the strong rebound experienced in 2021 from the COVID-19 crisis.
- The within-industry effect varied across industries. While in several countries positive growth persisted in information and communication sector and in business services, this was surpassed by the negative contribution of low-productivity industries (Figure 5.3). The largest decline in the within-industry effect was observed in Norway, followed by Estonia and Costa Rica, while the most substantial increase in the within-industry effect was experienced in Croatia, Sweden, and Portugal.
- The relative contributions of different industries to overall within-industry effect varied across countries, reflecting differences in countries' industrial structure and business environment. For example, some countries experienced an expansion of mining and utility activities, such as electricity, gas and water supply, which is traditionally a low-productive sector. This could be a response to the demand pressure for energy in European countries since early 2022, prompted by Russia's cut in supplies. Norway experienced the most pronounced decline in this sector's within-industry contribution to overall labour productivity growth in 2022, as their oil and gas production increased by around 8%. (OECD, 2023[1]). Similarly, in Estonia, oil shale electricity generation increased considerably due to high electricity prices in 2022 (IEA, 2023).

- Industries, which were most severely impacted by the COVID-19 pandemic, gradually recovered, albeit at varying paces across countries. The rebound was almost complete in some countries by 2022, such as the United States or Nordic countries, marked by the rapid increase in employment and hours worked within these industries. This resurgence, however, has mechanically lowered labour productivity growth, as the influx of new hires is often associated with low-skilled workers and less productive activities (Garnier, 2023[2]) (Jobs and Skills Australia, 2023[3]) (Fernald and Li, 2022[4]). Construction, wholesale and retail sectors experienced negative labour productivity growth in 2022 in many countries. The contribution of the accommodation, restaurants and personal services to the overall labour productivity growth varied, being negative in countries such as the United States and Australia, while positive in others.
- The labour productivity growth increase in hospitality and personal services in some countries in 2022 could potentially be tied to the ongoing digital transformation, such as the contactless mobile payment, digital menu accessible through QR codes, service robots or food delivery (Esposito et al., 2022[5]). The swift integration of technology and innovation in these industries not only responds to the challenges triggered by the pandemic but may also be reinforced by the prevailing labour shortages, which in some industries can be attributed to various factors, including the potential rise in workers bargaining power (Bachmann et al., 2021[6]) and the shifts in workers' preference, in particular in low-pay and low-quality jobs (Causa et al., 2022[7]) (Duval et al., 2022[8]).

Indicators



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How to read the indicators

The decomposition of aggregate labour productivity growth that is used in this chapter includes three main terms, each of them corresponding to a sum of industry contributions:

- A *within-industry effect*, where labour productivity growth in each industry is weighted by the industry share in total value added in year t-1.
- A *static reallocation effect*, accounting for changes between t-1 and t in the share of total hours worked of industries with different productivity levels. Industries with an increasing share in total hours worked contribute positively to aggregate labour productivity growth if they have an above-average labour productivity level.
- A *dynamic reallocation effect*, accounting for changes between t-1 and t in the share of total hours worked of industries with different productivity growth rates. An increase in the total hours worked share of industries with positive productivity growth has a positive effect on aggregate labour productivity growth. This effect is all the more significant if the industry value added is high.

For additional information on this decomposition of aggregate labour productivity growth, see the methodological note.

This chapter focuses on a subset of the total economy that excludes real-estate, public administration and defence, education, and health activities (i.e. total economy less industries L, O, P, Q in the ISIC rev. 4 classification). Real-estate activities are excluded because their value added is largely imputed (it includes the value of both actual and imputed housing rents in the economy) and disproportionate as compared to the corresponding work force in national accounts (mostly real-estate agents and employees of notary offices are attached to the real-estate industry in national accounts). Public administration and defence, education and health services are excluded because they are largely non-market. Hence, their output value is measured as the sum of input costs, and in several countries their output volume is measured by deflating input costs, thus conventionally excluding any productivity gains.

For most countries, the above decompositions of aggregate labour productivity growth rely on breakdowns of value added and hours worked into economic sectors at the 2-digit level of the NAICS 2017 classification (for Canada, Mexico, and the United States) or the ISIC rev. 4 classification. Due to data limitations, the decompositions for France, Germany, Italy, and the United Kingdom rely on a mix of 1-digit and 2-digit level data corresponding to the A38 level of the ISIC rev.4 classification, and the decomposition for Australia relies on 1-digit level data according to the ANZSIC 2006 classification. This corresponds to between 20 and 64 industries, depending on data availability in different countries. Except for a few cases, this is the most granular industry data publicly available in national accounts, but it might not be sufficient to fully capture the heterogeneity of economic activities. Therefore, it cannot be excluded that part of the within-industry effects presented above correspond to resource reallocations between firms or economic activities belonging to the same 2-digit industry. A complete assessment of the contribution of reallocations and business dynamism (entries and exits of firms) to aggregate labour productivity growth would require firm-level data.

Even though a more granular breakdown is used for all calculations, the following breakdown by industry is used to visualise the contributions of reallocation and within-industry effects to aggregate labour productivity growth in the figures included in this Chapter:

- Agriculture and mining: industries A and B in the ISIC rev. 4 classification; industries 11 and 21 in the NAICS 2017 classification
- Manufacturing and utilities, excluding manufacturing of ICT: industries C, D and E except C26-27 in the ISIC rev. 4 classification; industries 22 and 31-33 except 3361MV and 3364OT in the NAICS 2017 classification

- Construction: industry F in the ISIC rev. 4 classification; industries 23 in the NAICS 2017 classification
- Trade: industry G in the ISIC rev. 4 classification; industries 42 and 44RT in the NAICS 2017 classification
- Transport, accommodation, and personal services: industries H, I and R to U in the ISIC rev. 4 classification; industries 48TW, 71, 72 and 81 in the NAICS 2017 classification
- Finance and insurance: industry K in the ISIC rev. 4 classification; industry 52 in the NAICS 2017 classification
- Business services: industries M and N in the ISIC rev. 4 classification; industries 54 to 56 in the NAICS 2017 classification.

Macroeconomic data for recent years can be subject to revisions, especially in the years covering the COVID-19 pandemic.

Data sources

OECD National Accounts Statistics (database), http://dx.doi.org/10.1787/na-data-en.

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6 Productivity in SMEs and large firms

Context and key findings

Developments at aggregated industries levels can mask heterogeneity in productivity among firms within the same industry. For instance, it may be interesting to look at the contribution of small and medium-sized enterprises (SMEs). In several countries, a considerable number of low-productivity firms (many of them small firms) coexists with large firms that are highly productive and exposed to international competition. Productivity tends to increase with firm size, as large firms can benefit from increasing returns to scale. Firm-level productivity also depends on the industry enterprises are operating in. In addition, large firms tend to adopt new technologies more than small firms, unless the latter are new or younger companies.

While new small firms can also spur aggregate productivity growth when they exploit new technologies and stimulate productivity-enhancing changes by incumbents, severe economic downturns can lead to a missing generation of start-ups (OECD, 2023[1]). This has usually marginal effects in the short term, but the absence of these start-ups may affect long-term productivity, as they play a key role in competition, innovation (Kolev et al., 2022[2]) and job creation (Criscuolo, Gal and Menon, 2016[3])

Scale-up dynamics could also impact firms' productivity. Firms that scale up in employment tend to be more productive as they enter their high-growth phase and then catch up with their peers as they grow. While firms that scale up in turnover tend to expand their workforce in the year before scaling (leading to a drop in productivity), their employment grows more slowly on average during the subsequent period of high turnover growth, making them more productive than comparable non-scalers (OECD, 2021[4]). Finally, human capital (e.g., workforce skills, management skills) is another key factor that explains differences in productivity across firms (Criscuolo et al., 2021[5]).

Key findings

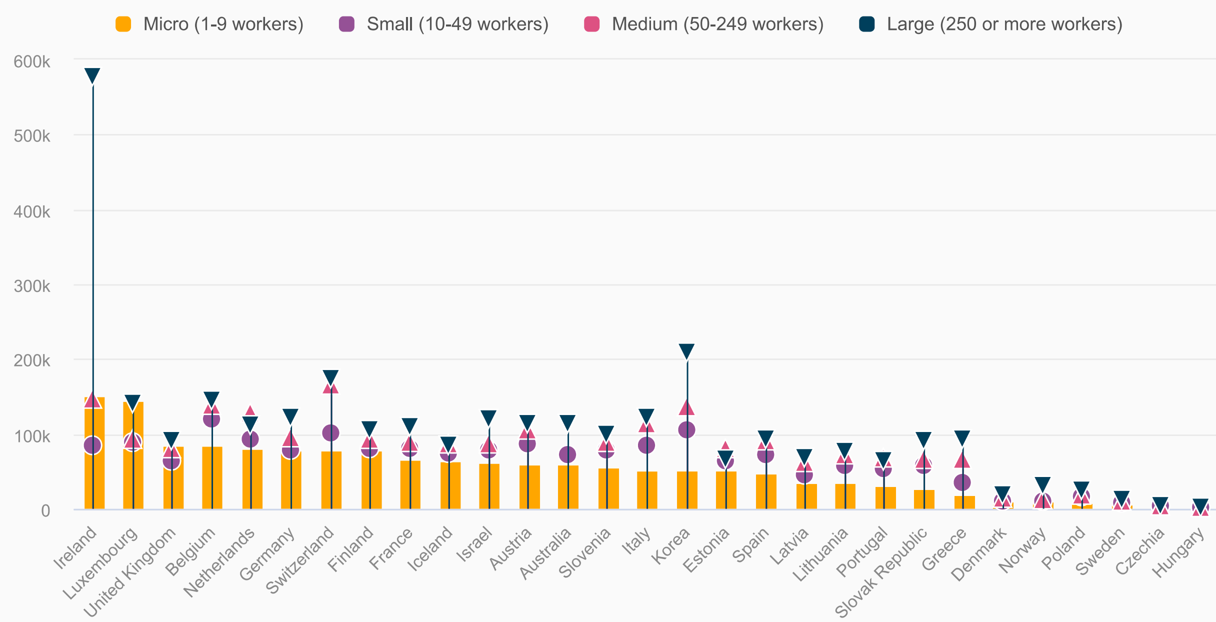
- **Large firms in the business sector had higher labour productivity compared to smaller companies in OECD countries.** The largest gaps in labour productivity levels in 2021 or the latest available year – measured as value added per person employed – between large and smaller firms were observed in Ireland and Korea (Figure 6.1). The gap in Ireland is mainly due to the presence of multinationals, which benefit from low statutory income tax rates (OECD, 2022[6]). In Korea, large firms have considerable market power, higher margins and capacity to invest than SMEs, widening the productivity gap between large and smaller Korean firms (OECD, 2022[7]).
- **In manufacturing, the productivity gap between large and smaller firms was on average more pronounced than in the business economy as a whole**, reflecting returns to scale from capital-intensive production (Figure 6.2). Among OECD countries for which data is available, micro manufacturing firms in Türkiye had the biggest productivity gap relative to large enterprises. In Ireland, both small and medium-sized manufacturing firms had the largest gap with respect to large firms as compared to OECD peers. Conversely, small and medium-sized enterprises in Estonia had the smallest productivity gap.

- **Compared with manufacturing, differences in labour productivity between firms of different sizes are less pronounced in business services.** In some OECD countries, smaller firms even outperformed large ones in terms of labour productivity (Figure 6.3). This reflects competitive advantages in niche activities with high brand value or intellectual property content, and the intensive use of information and communication technologies (ICT). Compared to manufacturing, the size advantage of large firms is reduced in knowledge-intensive services, with start-ups and young firms having a higher probability of successfully transforming knowledge into innovation output than mature firms, thanks to a highly skilled and productive workforce (Audretsch, Kritikos and Schiersch, 2020[8]).

Indicators

Figure 6.1: Labour productivity in SMEs and large firms, business economy

Value added per person employed, US dollars, current PPPs, 2021 or latest available year



OECD

Figure 6.2: Labour productivity in SMEs and large firms, manufacturing

Value added per person employed, index 250+=100, 2021 or latest available year

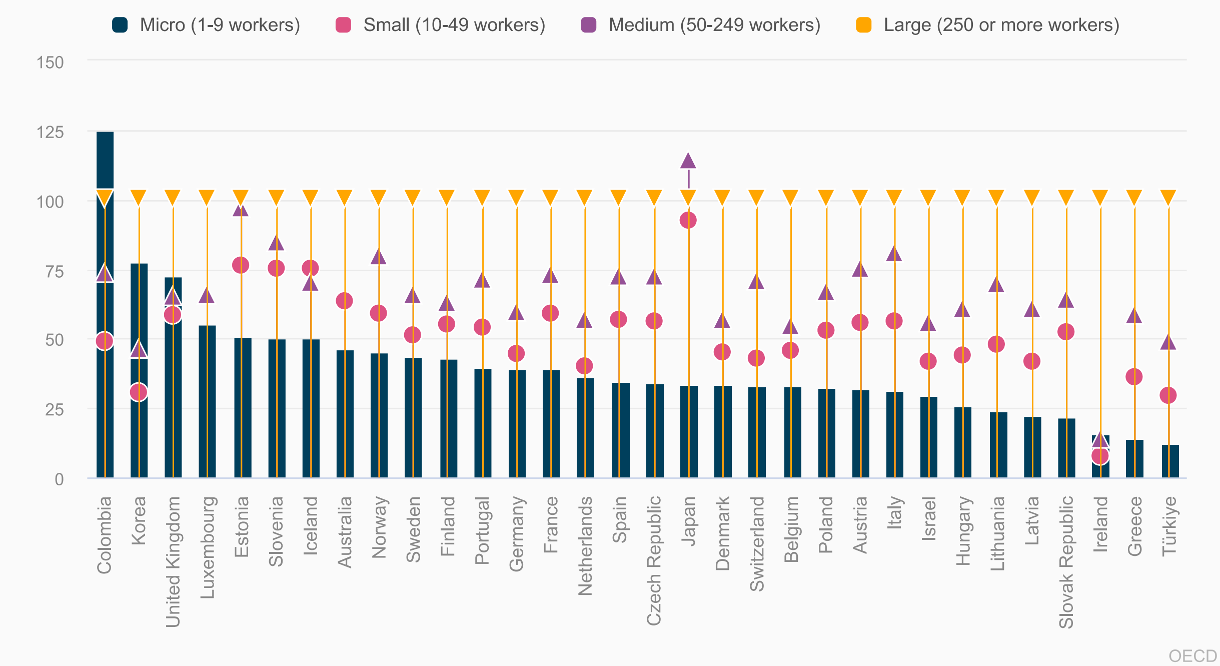
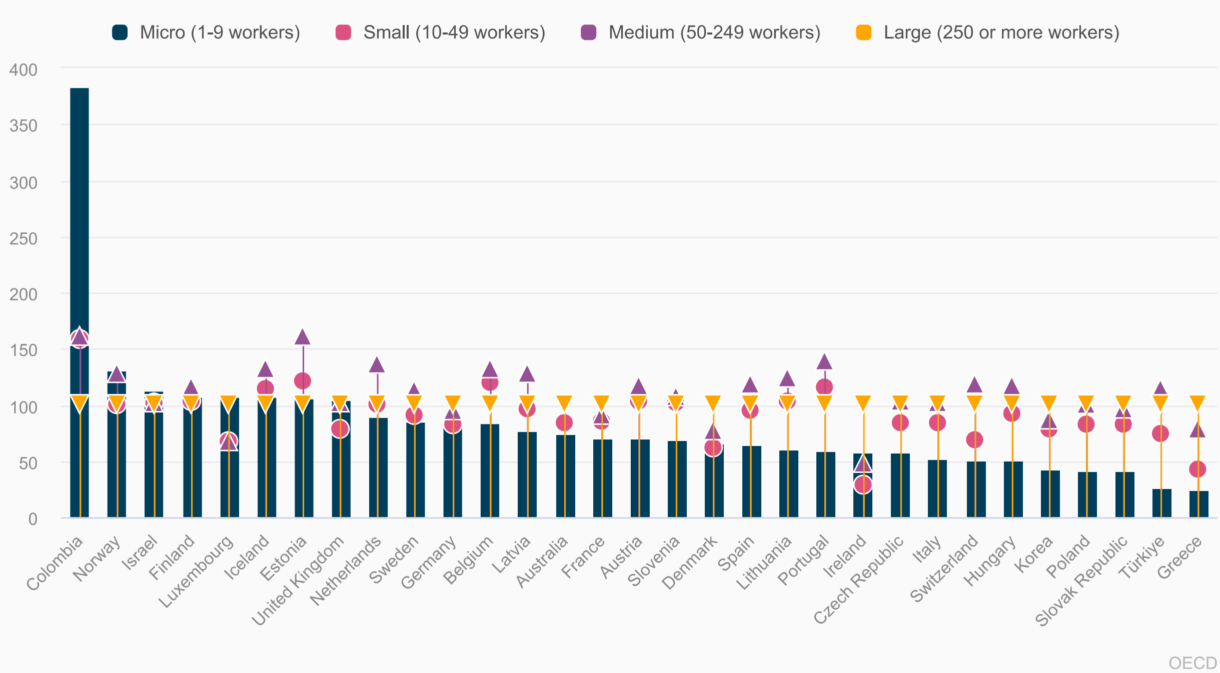


Figure 6.3: Labour productivity in SMEs and large firms, business services

Value added per person employed, index 250+=100, 2021 or latest available year



How to read the indicators

Labour productivity by firm size is measured as gross value added at current prices per person employed. Labour input is measured as total employment, which includes employees and all other paid or unpaid persons. Data on hours worked by all persons employed are typically not available by firm size.

Value added and total employment for different firm size are sourced from OECD Structural and Demographic Business Statistics (database). They typically do not perfectly align with the corresponding estimates in national accounts. The latter include several adjustments to reflect businesses and activities that may not be covered by structural business statistics, such as the non-observed economy. Since labour input is measured as total employment, the cross-country comparability of labour productivity measures by firm size may also be affected by differences in the share of part-time employment.

In this chapter, "business economy" covers mining and quarrying (B), manufacturing (C), electricity, gas, steam and air conditioning supply (D), water supply, sewerage, waste management and remediation activities (E), construction (F) and business services (excluding finance and insurance activities). Business services include wholesale and retail trade, repair of motor vehicles and motorcycles (G); transportation and storage (H); accommodation and food services (I); information and communication services (J); real estate activities (L); and professional, scientific, administrative and support activities (M and N) (letters between brackets correspond to the industry codes in ISIC rev. 4).

Data sources

OECD Structural and Demographic Business Statistics (database), http://dx.doi.org/10.1787/sdbs-data-en.

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7 Investment

Context and key findings

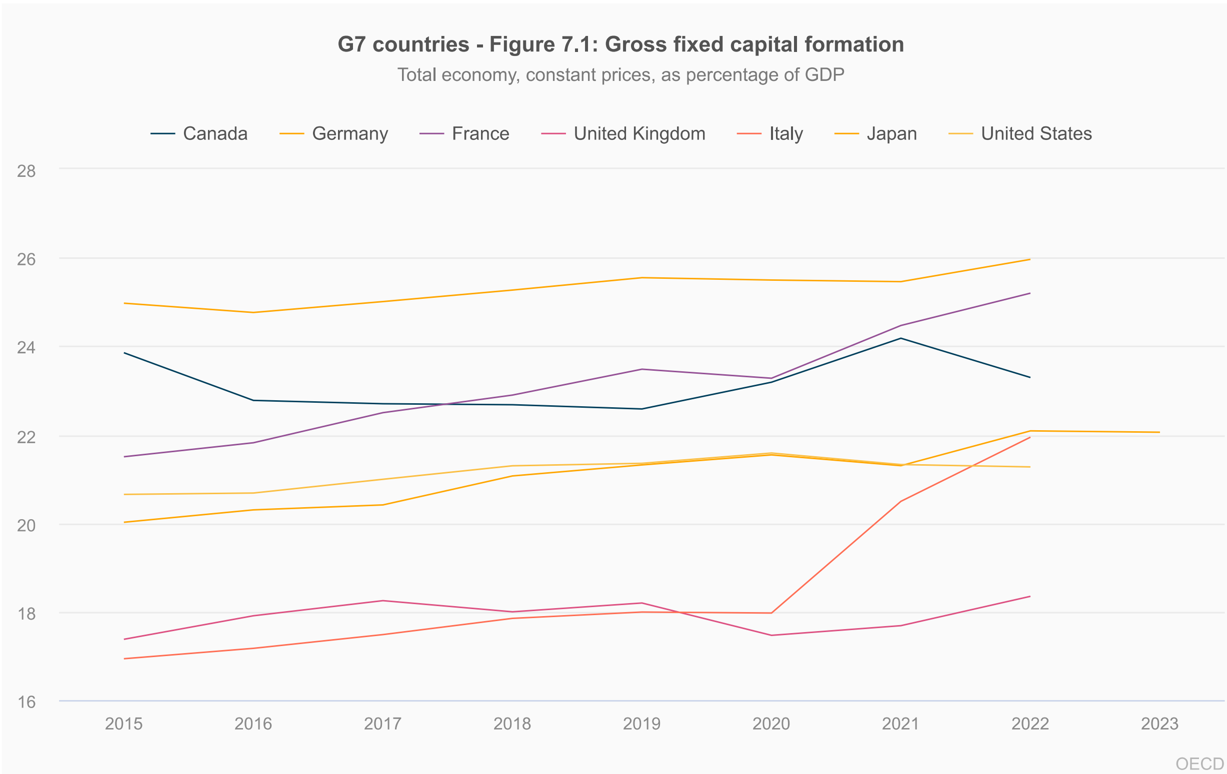
Breaking down investment and capital by asset type helps to better understand the main drivers of GDP and productivity growth. For example, it allows assessing the state of infrastructure and the volume of investment in growth-enhancing technologies, such as information and communication technology. Moreover, different asset types contribute in different ways to GDP and productivity growth. As explained in Chapter 4 Productivity and Economic Growth, capital services are the appropriate measure of capital input in productivity analysis and their measurement depends on the composition of the capital stock.

Capital stock is broken down into homogeneous asset groups with similar price deflators and depreciation rates. The 2008 SNA update introduced capitalising expenditures in weapons systems and research and development (R&D), which were previously considered intermediate consumption. Nevertheless, important intangible assets such as brand equity, data, and organisational capital remain outside the national accounts' asset boundary. However, work is underway on how to better capture the extent of various aspects of digitalisation in the next update of the SNA in 2025.

Key findings

- **In around half of OECD countries, gross fixed capital formation (GFCF) grew faster than GDP in 2022, leading to increasing investment rates** (investment over GDP, in current prices). In about a third of the countries the investment ratio declined in 2022, with the biggest declines (over 3 percentage points) recorded in Estonia and Norway. G7 countries' investment rates grew, except in the United States where the rate was broadly stable and in Canada where it declined (Figure 7.1).
- **Around three-quarters of OECD countries reached or even exceeded their pre-pandemic (2015-2019) investment rates. However, several countries have yet to catch up with these rates**, most notably Ireland, Norway, Colombia and Poland whose rates are still over 10 percentage points below pre-pandemic levels.
- **The developments in disaggregated asset categories varied across countries in 2022. The most dynamic categories on average were dwellings and other buildings and structures and intellectual property products.** In about a third of the countries with available data, the combined category of dwellings and other buildings and structures was the most dynamic asset category (in terms of investment to GDP), with the biggest increases registered in Hungary, Israel, Italy, Finland and Germany. Investment rate of Intellectual property products (IPP) was slightly negative in about two thirds of countries with data. Estonia and Ireland saw relatively large decreases in their IPP investment rates, in excess of 1.5 percentage points. By contrast, the biggest increases were recorded in Denmark, Czechia, Sweden, Korea and France. The investment rate in other machinery and equipment and weapons systems slightly increased in majority of the countries, with biggest increases in Sweden, Ireland and France. Similarly, transport equipment investment rate slightly increased in majority of the countries, with the biggest increases in Estonia and Slovenia.

Indicators



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How to read the indicators

Table 7.1 below presents the minimum asset breakdown recommended by the 2008 System of National Accounts (2008 SNA).

While ICT assets are internationally traded and should be subject to similar price changes across countries, it has been observed that statistical agencies use (sometimes very) different price indices to deflate nominal investment in ICT assets. In addition, they also assume different depreciation rates and service lives for these assets. For these reasons, the OECD estimates productive capital stocks and capital services using a set of harmonised ICT investment deflators as well as common depreciation rates and average service lives for all assets and countries (Schreyer, 2002[1]).

Depending on the purpose of the analysis, different assets can be grouped into different categories. For example, dwellings, other buildings and structures, machinery and equipment and weapons systems, and cultivated biological resources may be grouped into tangible assets, as opposed to intangible assets, also referred to as intellectual property products (IPPs). A different classification often used in economic analysis distinguishes information and communication technology (ICT) and non-ICT assets. ICT assets include computer hardware, telecommunication equipment, and computer software and databases, while non-ICT assets include dwellings, other buildings and structures, transport equipment, other machinery and equipment and weapons systems, cultivated biological resources, and intellectual property products except computer software and databases.

The asset breakdown presented in Table 7.1 differs from the one recommended by the 2008 SNA for a few countries. In Korea, ICT equipment is included in other machinery equipment and weapons systems. In Australia, ownership transfer costs are included in total GFCF but are not allocated across assets. Consequently, the sum of GFCF for individual assets is lower than total GFCF for this country. In Norway, total GFCF excludes investment in weapons systems. In Indonesia, other buildings and structures are included in dwellings. In Argentina, China, Colombia, India, Saudi Arabia and Türkiye, the classification of GFCF by type of asset is not available. Therefore, only total GFCF is presented. In Canada and the United States, total GFCF excludes GFCF in cultivated biological resources.

For further methodological information, consult the *OECD Productivity Statistics – Methodological notes* at https://www.oecd.org/sdd/productivity-stats/OECD-Productivity-Statistics-Methodological-note.pdf.

Table 7.1. Breakdown of fixed capital assets according to the System of National Accounts 2008

	2008 SNA code	Produced fixed assets	
Tangible assets	**N111**	**Dwellings**	**Non-ICT assets**
	N112	**Other buildings and structures**	
	N11M	**Machinery and equipment and weapons systems**	
	N1131	Transport equipment	
	N1132	ICT equipment	**ICT assets**
	N11321	Computer hardware	
	N11322	Telecommunications equipment	
	N110	Other machinery and equipment and weapons systems	**Non-ICT assets**
	N115	**Cultivated biological resources**	
Intangible assets	**N117**	**Intellectual property products**	
	N1171	Research and development (R&D)	
	N1172	Mineral exploration and evaluation	
	N1173	Computer software and databases	**ICT assets**
	N1174	Entertainment, artistic and literary originals	**Non-ICT assets**
	N1179	Other intellectual property products	

Source: OECD elaboration based on the 2008 System of National Accounts.

Data sources

OECD National Accounts Statistics (database), http://dx.doi.org/10.1787/na-data-en.

OECD Productivity Statistics (database), http://dx.doi.org/10.1787/pdtvy-data-en.

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8 Labour income and productivity

Context and key findings

Employers' ability to raise wages and other forms of labour income depends on increases in labour productivity, highlighting the welfare implications of productivity growth and its role as a key driver of long-term living standards. Several OECD countries have experienced a slowdown in productivity growth and in real average wage growth. Empirical evidence points to a decline in labour income shares since the mid-1990s in the majority of OECD countries, at least when measured from a producer perspective with gross income as a reference (Cho, 2017[1]). These developments have resulted in a decoupling between labour productivity and real labour income growth (Schwellnus, 2017[2]).

In this chapter, labour productivity is defined as real gross value added per hour worked. Labour share represents the share of total labour compensation in gross value added. Labour income – measured by average labour compensation per hour worked, is adjusted for inflation using the same price index applied to deflate value added (and hence productivity). Real labour productivity growing faster than average hourly real labour compensation (so-called decoupling) will thus lead to a decline in labour share (see more details below in How to read the indicators).

The focus of the chapter is on labour income share developments after excluding primary, real estate, and non-market sector, as developments in those sectors are usually driven by specific factors, such as commodity and asset price developments and national accounting conventions.

The well-being impact of the divergence between average hourly labour income and productivity growth rates is further exacerbated by the widespread slowdown in productivity growth, and in some countries even more so when real labour income is adjusted for inflation using the consumer price index (CPI). Indeed, inflation based on value added or consumer prices can differ significantly, reflecting for instance the effect of terms of trade. Also, the value-added deflator reflects movements in the prices of all goods and services domestically produced, whereas the CPI captures movements in the prices of goods and services in private household consumption only. These can either be imported or domestically produced.

Labour income shares and comparisons between average hourly real labour income and productivity developments in this chapter do not account for labour income inequalities across workers. The majority of OECD countries have experienced a further dissociating between median and average labour income since the mid-1990s, which is related to disproportionate labour income growth at the top of the income distribution (Bivens, 2015[3]) (Schwellnus, 2017[2]).

Despite a large amount of research on the determinants of decoupling, there is no clear consensus on the mechanisms behind it and a number of factors have been put forward. Paternesi, Meloni and Stirati (2023[4]) emphasise that technological progress displaces low-skilled labour in favour of capital and high-skilled labour, which would lead to a deterioration of low-skilled wages, which in turn would not be compensated in the aggregate by rising wages for the skilled group. Karabarbounis and Neiman (2014[5]) argue that the labour share has fallen due to a fall in the price of investment goods. Combined with an elasticity of substitution between labour and capital greater than one, this would lead to capital deepening and a reduction in the labour share. Mishel and Bivens (2021[6]) show that high unemployment, the erosion of collective bargaining, and globalisation are the main factors putting downward pressure on wages in the United States. Stirati and Paternesi Meloni (2021[7])argue that the impact of labour market slack is depressing the private sector labour share in major OECD countries. Guschanski and Onaran (2022[8]) also find that offshoring and changes in labour market institutions are relevant factors in reducing the labour share in some OECD countries. Pro-competition product market regulations and labour market policies (Pak, 2019[9]), as well as changes in the industry composition of the economy (OECD, 2012[10]) can also affect labour shares.

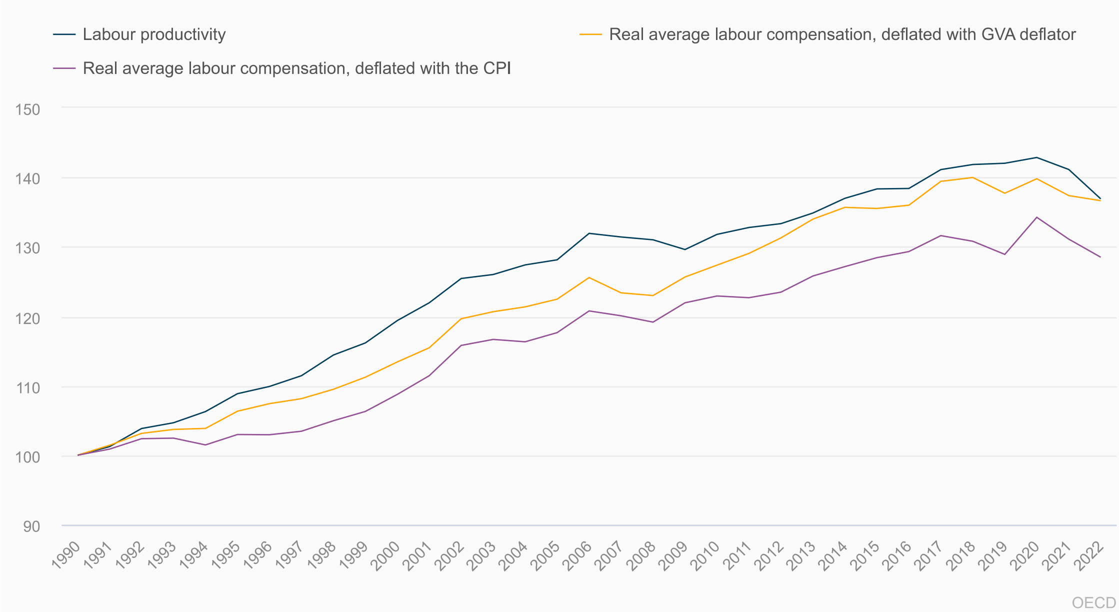
Key findings

- **Real average labour income per hour worked (deflated with the GVA deflator) has failed to keep up with labour productivity growth since the mid-1990s in around a quarter of OECD countries with available data** (Figure 8.1.). This has occurred in addition to the widespread slowdown in labour productivity growth observed over the past decades, which has further undermined the increase in real average labour income per hour worked.
- **The decline in labour shares on average across OECD countries since the mid-1990s is less pronounced when the primary, real estate, and non-market sectors are excluded.** In those sectors labour share developments are largely driven by commodity and asset price developments and national accounting conventions. This finding holds true for most of the countries for which data are available and whose labour shares have declined since 1995 (Figure 8.3.).
- In around a third of the countries for which data are available, **the decoupling of average hourly real labour income growth from productivity growth in total economy is further exacerbated when labour compensation is adjusted for inflation using the consumer price index** (CPI) (Figure 8.2.).
- **In most OECD countries labour productivity and CPI-based real average labour income evolved in the same direction in 2022 when looking at the narrower defined business sector**, i.e. decreasing in most countries. However, as productivity and average hourly labour income often evolved at different paces, the negative gap between average hourly labour income and productivity growth rates widened in some countries (e.g. in Czechia, Hungary or Netherlands), while the negative gap narrowed in others (e.g. France or Slovenia). In some, the gap was positive and narrowed (e.g. Estonia or Greece).
- **Italy, Portugal and Spain are the only OECD countries with available data where labour productivity increased (or was stable) while real average labour income fell in 2022, both for total economy, and for the business economy excluding primary, real estate and non-market sectors**. This resulted in a negative gap between CPI-deflated average hourly labour income and productivity growth. This gap is relatively narrow for the total economy, but more pronounced for the business economy excluding the primary, real estate and non-market sectors.
- **In Estonia, Lithuania, and Latvia, the positive gap between real average hourly labour income and labour productivity growth persisted, though it decreased somewhat in 2022**. The positive gap emerged in the mid-2010s for Lithuania and Latvia, and in the mid-2000s in Estonia. This may to some extent be due to a catching-up effect of these former transition economies (OECD, 2022[11]) (OECD, 2022[12]), as well as more recently to increases in minimum wages and tightening labour markets (OECD, 2022[11]) (OECD, 2023[13]). In addition, the informal sectors are estimated to be relatively large in the Baltic economies (Elgin, n.d.[14]). This can lead to distortion of the gap between the two measures.

Indicators

France - Figure 8.1: Labour productivity and real average labour compensation, total economy

Indices, 1995 (or earliest available year) = 100



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France - Figure 8.2: Labour productivity and real average labour compensation, total business economy excluding primary and real estate activities

Indices, 1995 (or earliest available year) = 100

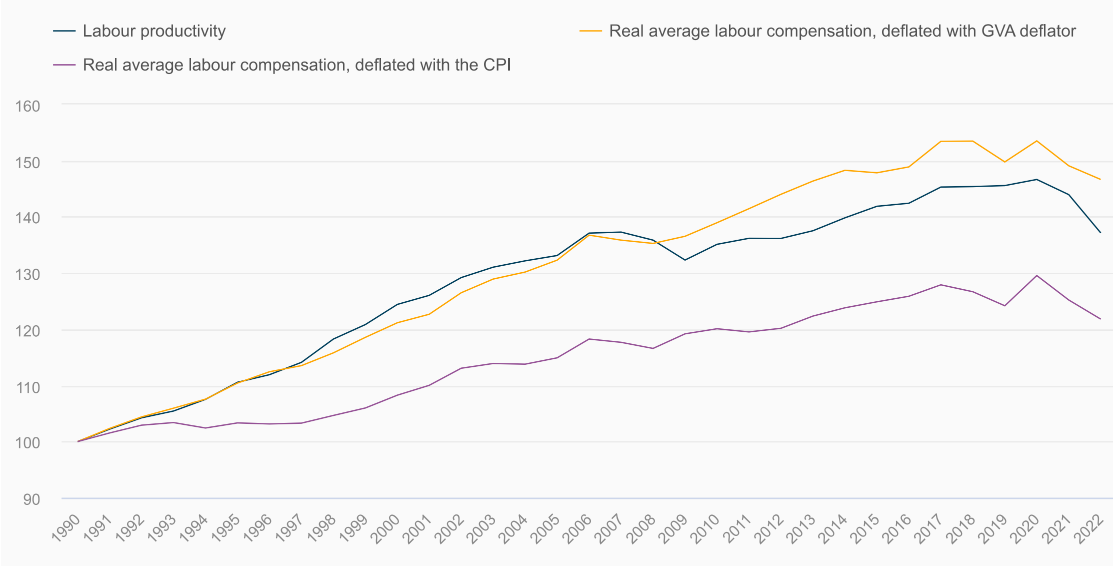

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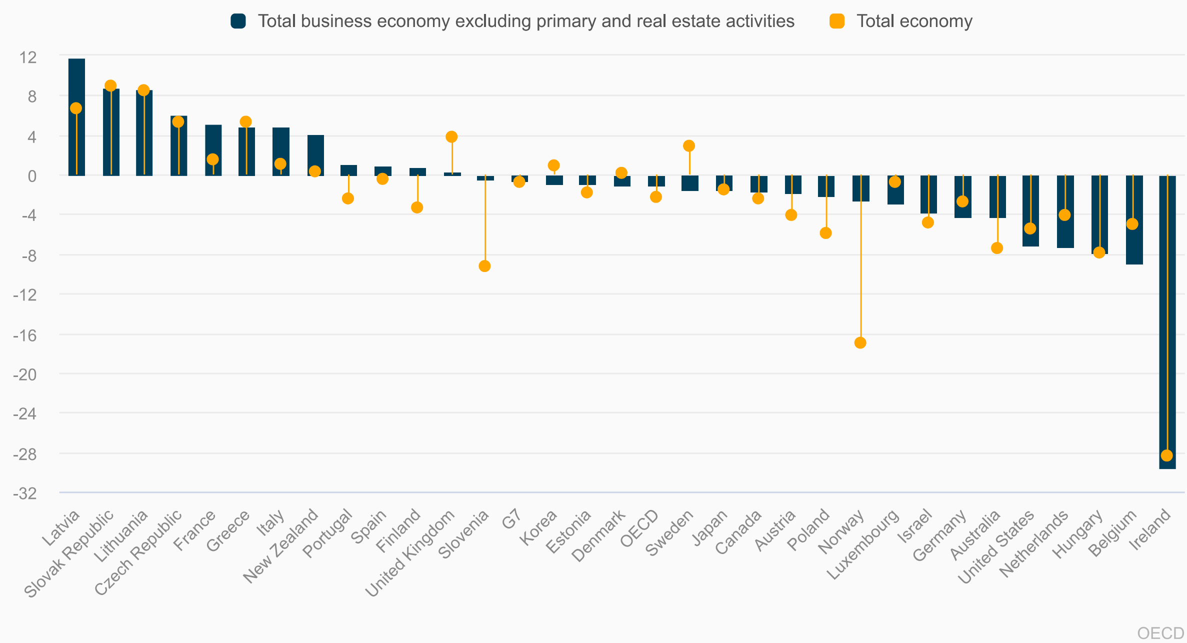
Figure 8.3: Changes in labour income shares

Percentage points, 1995-2022 or latest available year



How to read the indicators

Labour productivity in this chapter is defined as the ratio of real value added *at factor cost* – that is the production cost of products and services excluding the value of taxes and subsidies on production – to total hours worked, while average labour income is defined as the ratio of total labour compensation to total hours worked.

Total labour compensation is computed as the sum of the compensation of employees and self-employed workers. The labour compensation received by employees includes remunerations in cash and in kind and employees' and employers' social contributions. It is readily available in the national accounts. As the labour income received by self-employed is recorded in national accounts as mixed income, which bundles both their labour and capital income, the labour compensation received by self-employed has been imputed. Following (Schwellnus, 2017[2]), it is assumed that the hourly compensation of self-employed workers is equal to the hourly compensation received by employees at the level of each individual industry. For a few countries, hourly compensation received by employees by industry is not available. In such cases, aggregate compensation per employee is used.

The total business economy excluding primary and real estate activities includes the ISIC Rev.4 industry codes C to N, excluding L, plus R and S. However, for Israel, Japan, Korea, New Zealand the data includes the ISIC Rev.4 industry codes B to N, excluding L, plus R to U. For Switzerland, in the absence of information by industry, total labour compensation is compiled using compensation of employees, and hours worked for the total economy.

The focus of the chapter is on labour income share developments after excluding primary, real estate, and non-market sectors, as labour shares is those latter industries is often driven by specific factors. For example, the value added of the real-estate sector includes all (actual and imputed) housing rents in an economy, whereas the corresponding labour income is only related to the workers in the real-estate sector. Therefore, the labour share in the real-estate sector is well below the labour share of the total economy and does not reflect the labour market mechanisms connecting labour income to productivity. Moreover, housing rent developments can lead to large fluctuations in total-economy labour shares when the real-estate sector is relatively large.

Similarly, developments in total-economy labour shares may be largely driven by fluctuations in commodity prices in countries with large primary (i.e. agricultural or mining) sectors. For example, when commodity prices increase, aggregate profits rise without commensurate increases in wages.

Lastly, according to national accounting conventions value added in the non-market sector (e.g. education, health, and public administration) is measured as the sum of labour compensation and capital consumption, which may bias labour share in these sectors and artificially limits its variation over time.

Data sources

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